

Fig. 1A-1C

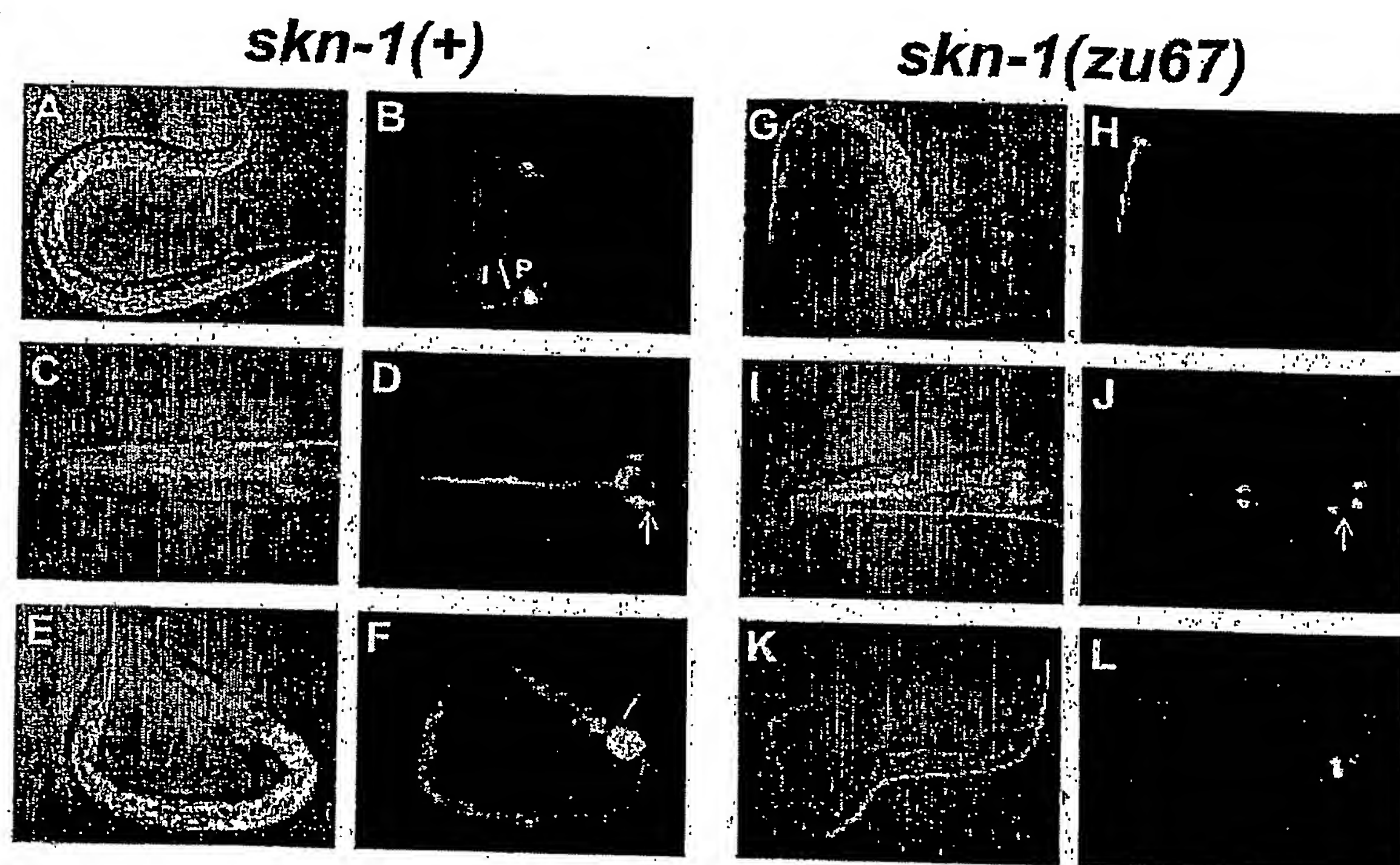


Fig. 2A-2L

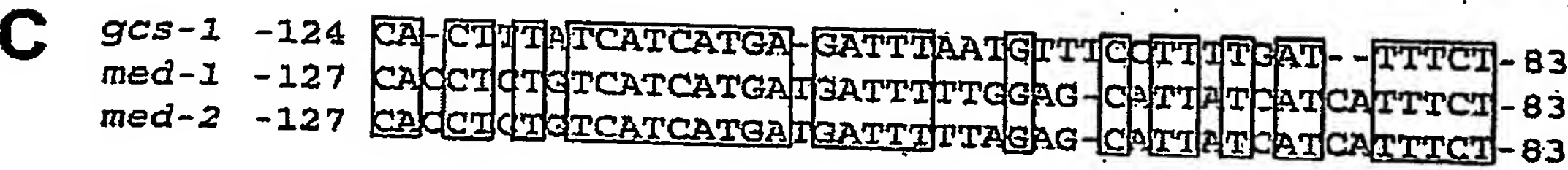
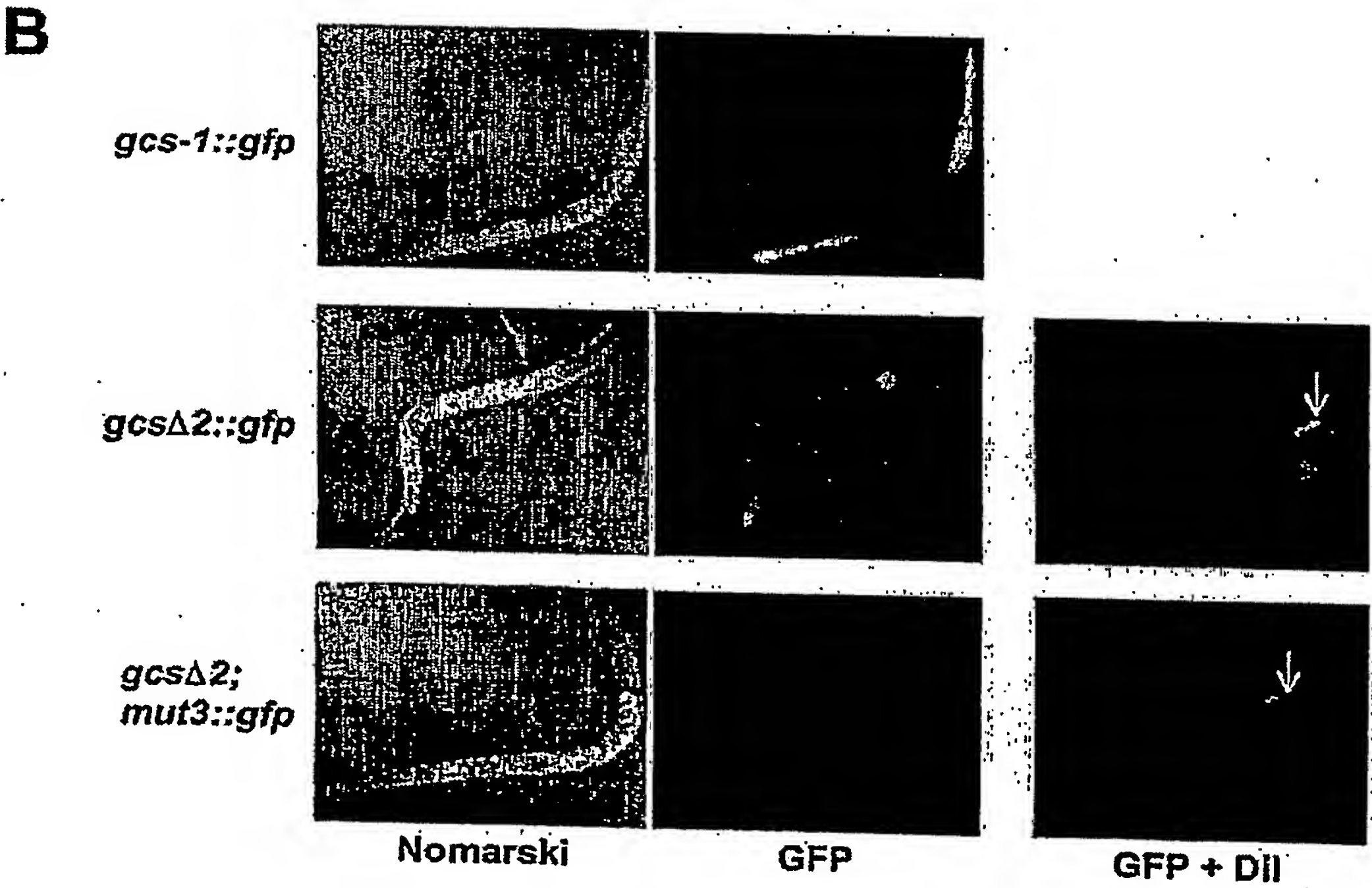
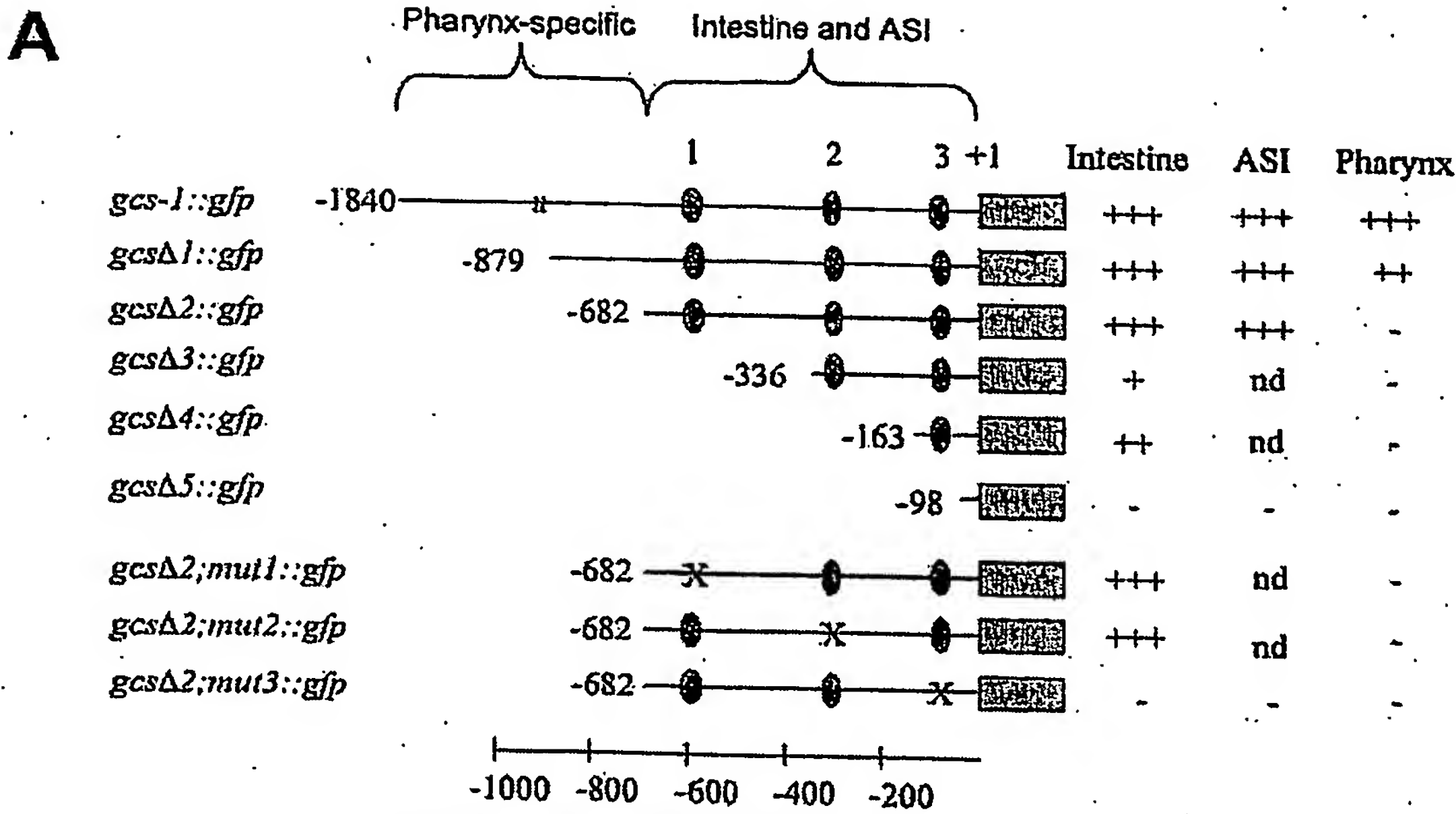


Fig. 3A-3C

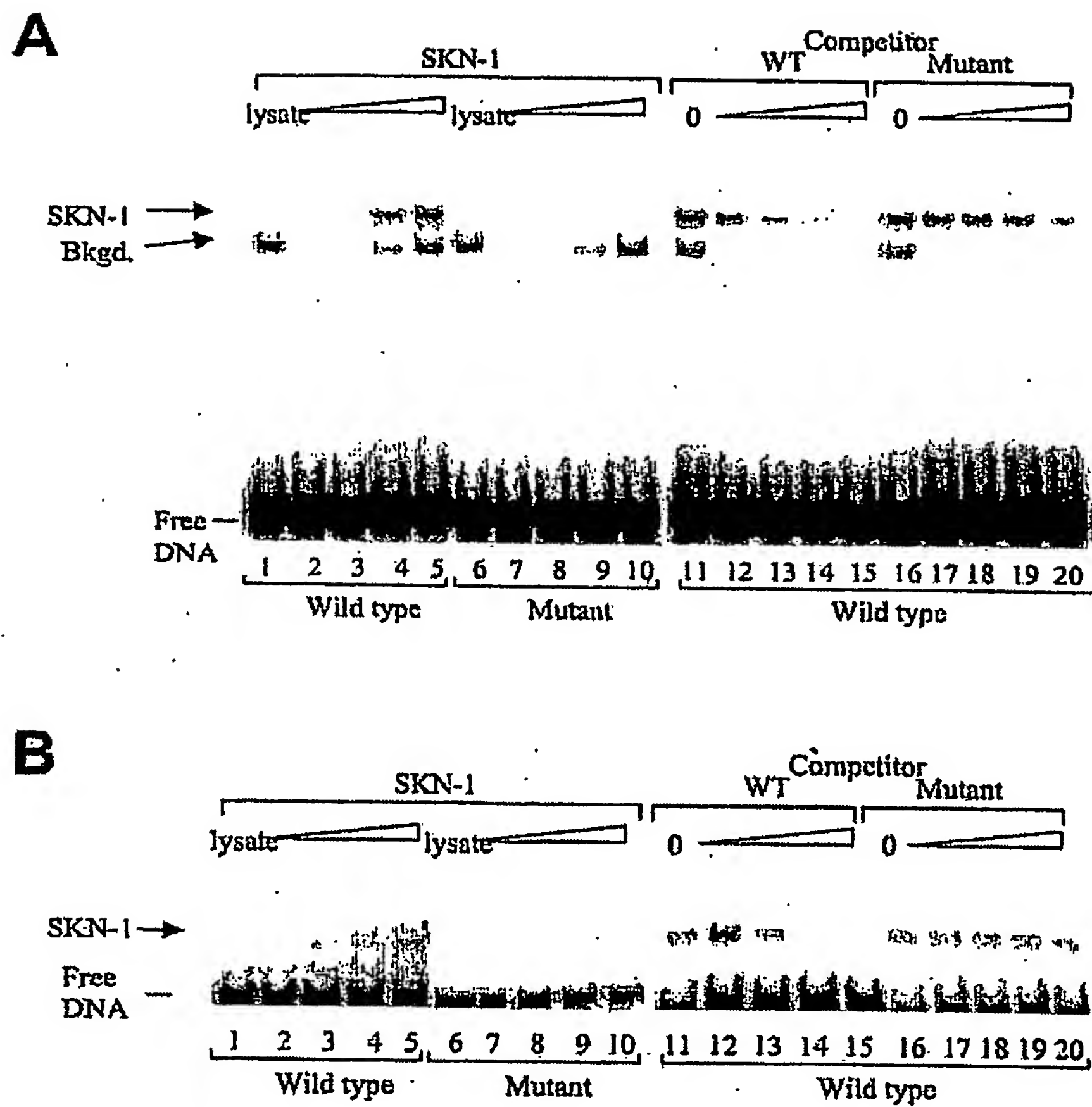


Fig. 4A-4B

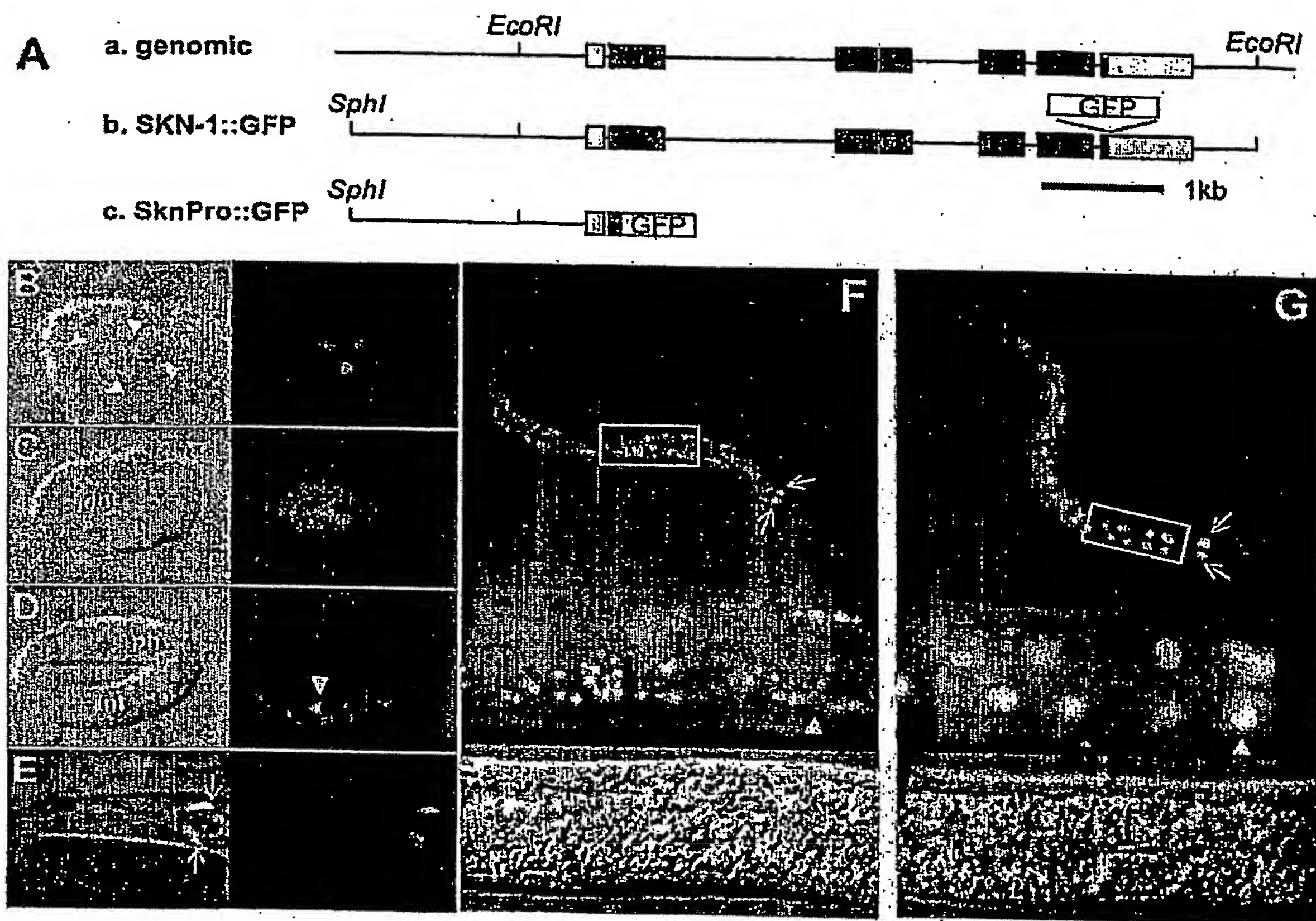


Fig. 5A-5G

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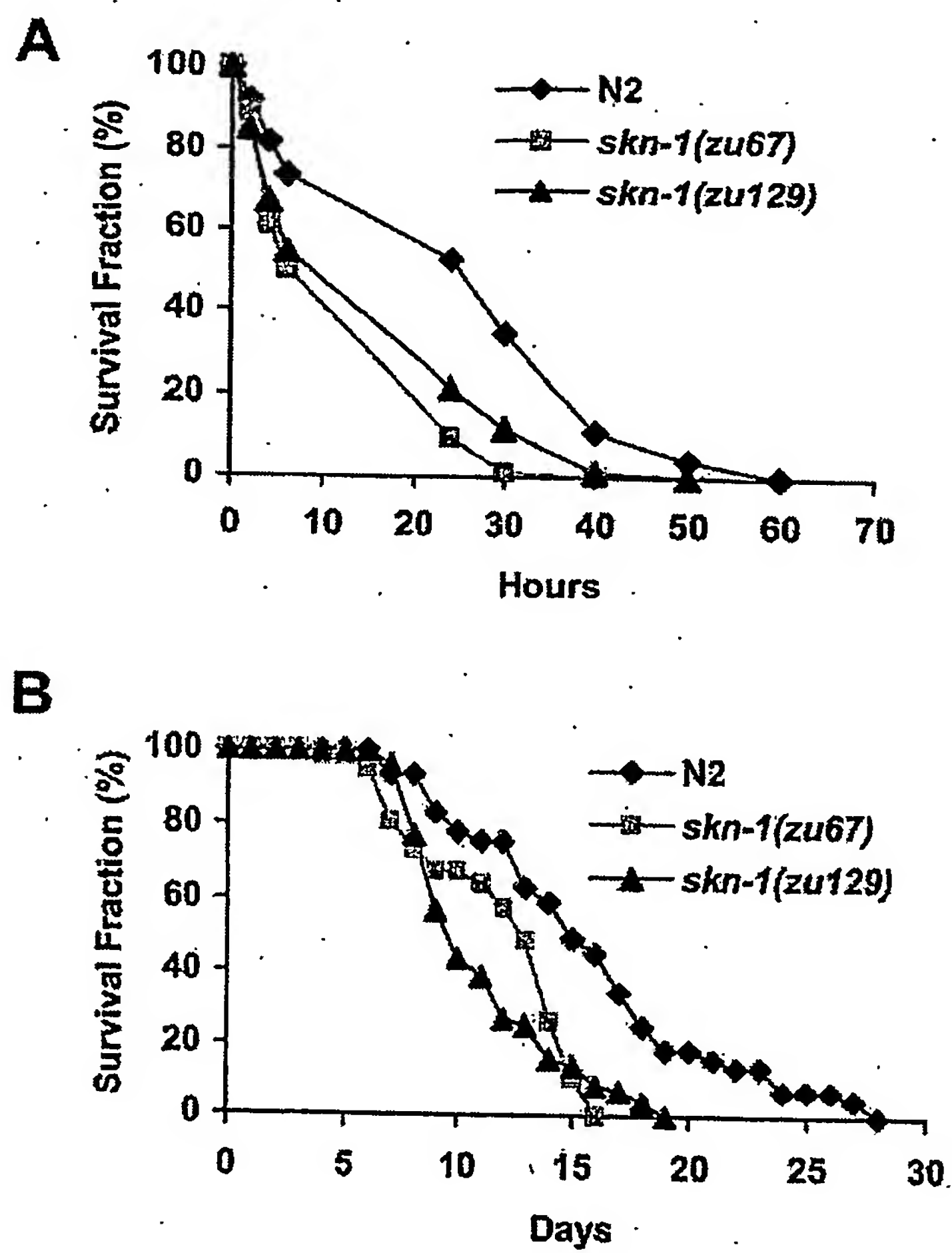
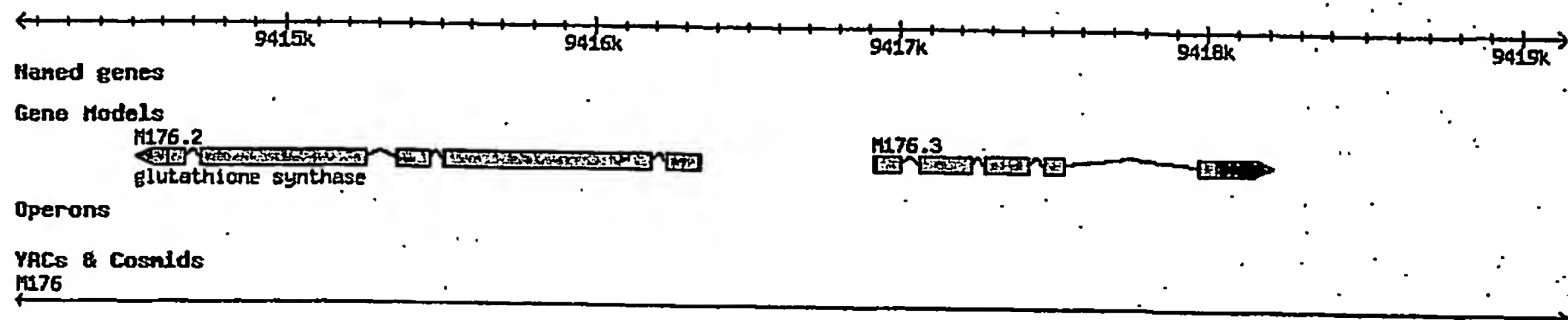


Fig. 6A-6B



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The M176.2 gene is located on chromosome II. Regulatory sequences can be found e.g., in the region between 9416340 and 9415915. An exemplary sequence of this region is as follows:

GACAATTATCGATTAATAAAAAGTTTAAACAGACACGAGAAATTAAATATAAAAAATTGAATTGTTTATTT  
 GTTGTGTTTGTGTGTAGAAAAATAATTTTGATAGAAACAAAAAATTAGCGTAAAATAAATAGCTAGCGCAA  
 TACTCGTGCACGAGATGTGCGCCAGCAGCTCCTTGACGCAAAACGTGACGTTTAGCACCAAAATGATTTT  
 -378  
 TGCTCTTTGAGTTCTTTGTTTTTCGGGAGCAAATTCATGCCAATCCCTTTCTTTTTTCAAATTTTCCTG  
 TTAAATTCATGTAATAACTATTATTCATGTCAATTACAACAAATAAGCATCCAAGATTTTATCATAAACT  
 -243  
 CGTTCAAACCTCCTTTTACCACTCGAAAAGCAATATCTCCGACTTCCTTCAAAGAGAAATGATGACAAAA  
 -169  
 CATAGAAACCTCACGTTATACGTTTGTGTCATCACGATTTTCAGTGCTCACTTTTCTCATTTTCATTCTCGCT  
 -137  
 TAATTCATTTTTGTCACTCTCGCGTCATGTTTTGCATTTTTCGAAAGCATTTATTTAAAACTGAAAAA  
 TAATTCGTAATTTTTCAAGAATGGCT

FIG. 7

## Exemplary M176.1 sequences:

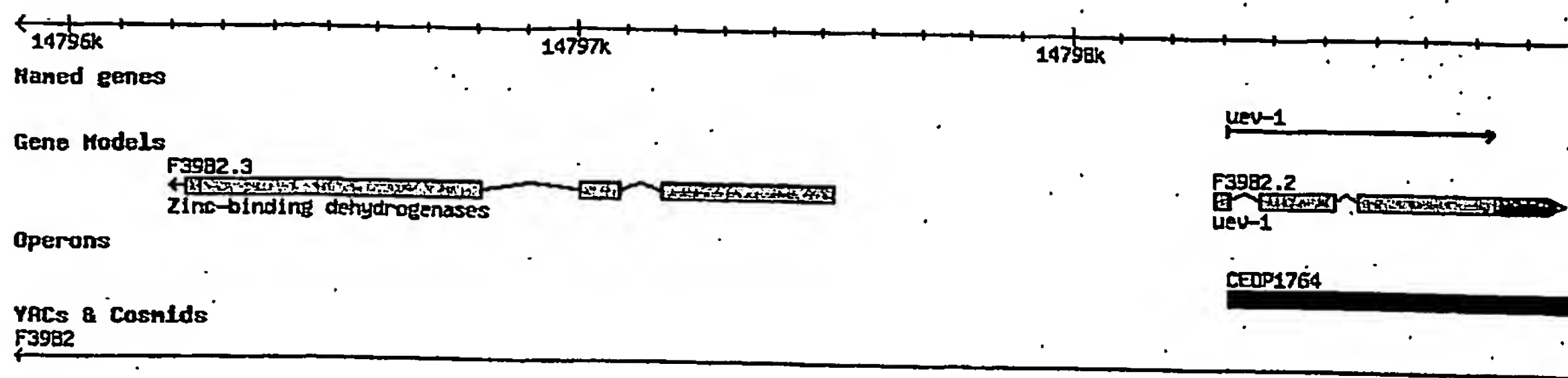
Amino Acid Sequence							
MAQKDDRILL	LNAPRLPLED	DKLNELTADL	HDWAHANGLV	MRLSTDKLSS	EVCQTTPLTL	LPSFPKPNVF	EEAVHIQNLF
ASLYHFIAYE	FDFLIDIHKN	VVKTDDEFTRN	MVEILKKVKA	QGLKQPVTLA	IQRSDYMCHK	DQYSAEYGLK	QIEINNIASS
MGAHALRLTE	WHIRVLKALN	ISDDVIQRAI	PENKPIPMIA	EALFKAWSHF	SNPAAVVLVV	VENVNQNQID	QRHVEYELEK
LGVPMTCIIR	RNLTQCYEQL	SLNDRSDLMI	DGRQVAIVYF	RAGYSPDHYP	STKEWEARER	MELSTAIKTP	WIGLOVANTK
KTQQVLSEDG	VLERFIGKPR	EARDIRASFA	GMWALENTDE	VTMKVVAGAQ	KHPEAFVLKP	QTEGGAALHT	GDEMVOMLRE
LPEEERGAFI	LMEKLKPMII	ENYLVLAKKP	ITFAKAVSEL	GVYGYAFGRK	DAPELKTAGH	LLRTKPESTA	MGGVAAGHAV
VDTPFLYEFI							

Spliced mRNA							
aaagaATGGCT	CAAAAAGATG	ACCGGATTTT	GCTGTTGAAT	GCTCCAAGGC	TCCCGCTCGA	AGATGATAAG	CTCAACGAGC
TCACCGCTGA	TCTTCACGAT	TGGGCTCATG	CTAATGGGCT	TGTCATGCGT	CTATCAACCG	ACAAGTTGAG	CAGCGAAGTT
TGTCAAACATA	CTCCATTAAC	ACTTCTTCCA	TCTCCATTCC	CGAAAAATGT	TTTTGAAGAA	GCAGTTCATA	TTCAGAACCT
TTTCGCAAGT	CTTTATCACT	TCATAGCTTA	TGAATTTGAT	TTTCTAATCG	ATATTCATAA	AAATGTCGTG	AAAACGTATG
ATTTACACACG	GAATATGGTT	GAGATCTTGA	AGAAAGTCAA	AGCCCAAGGA	CTCAAGCAAC	CAGTCACTCT	CGCGATTCAA
CGATCTGATT	ATATGTGTCA	TAAGGATCAA	TATTCAGCGG	AATATGGACT	GAAACAAATT	GAAATAAACA	ATATCGCCTC
GTCAATGGGA	GCACATGCTC	TACGGCTCAC	CGAATGGCAT	ATCAGAGTTC	TTAAAGCGTT	GAACATTTCC	GATGACGTCA
TTCAAAGAGC	AATTCCAGAA	AACAAGCCAA	TTCCAATGAT	CGCTGAAGCT	TTATTCAAGG	CCTGGTCCCA	CTTTTCGAAC
CCAGCAGCTG	TGGTTCTTGT	CGTTGTAGAA	AACGTCAATC	AAAATCAGAT	TGATCAACGC	CACGTGGAAT	ATGAACTTGA
AAAGTTAGGA	GTACCGATGA	CATGTATTAT	TAGAAGAAAT	TTAACACAAT	GCTATGAACA	ATTATCATTG	AATGATAGAA
GCGATTTGAT	GATTGATGGG	CGTCAAGTAG	CAATTGTTTA	CTTCAGAGCA	GGATACTCAC	CTGATCATTA	TCCATCTACA
AAAGAATGGG	AAGCACGTGA	GCGTATGGAA	CTTTCCACCG	CTATCAAAAC	TCCATGGATC	GGGCTACAGG	TGGCAAATAC
TAAGAAGACC	CAGCAGGTTT	TTTCTGAAGA	TGGAGTACTC	GAAAGATTCA	TCGGAAAACC	ACGAGAAGCT	CGCGATATTC
GAGCTTCATT	CGCAGGAATG	TGGGCTTTGG	AGAACACTGA	TGAAGTGACT	ATGAAAGTCG	TGGCTGGAGC	TCAAAAACAT
CCAGAAGCGT	TTGTTCTGAA	GCCACAAACT	GAAGGTGGAG	CCGCATTGCA	CACCGGTGAT	GAGATGGTTC	AAATGCTCCG
AGAACTTCCG	GAAGAAGAGC	GTGGAGCTTT	CATTTTGATG	GAGAAACTGA	AACCGATGAT	TATTGAAAAC	TACCTGGTTC
TTGCAAAGAA	GCCGATCACA	TTTGCTAAGG	CTGTTAGTGA	ACTTGGAGTG	TATGGTTATG	CATTTGGAAG	GAAGGATGCA
CCTGAGCTTA	AGACTGCTGG	GCATTTGCTC	CGAACGAAAC	CGGAATCCAC	AGCTATGGGT	GGAGTAGCCG	CCGGACATGC
TGTTGTCGAC	ACCCCATTC	TCTACGAATT	TATTTGAttt	cgaacataat	cagaaaactc	aacaaaaatg	ctgtgatatg
aaaccatttg	ctatttagat	ctttttgtgt	ttgtaaattt	aatcattgta	atttattgaa	tgt	

FIG. 8



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The F39B2.3 gene is located on chromosome I. Regulatory sequences can be found e.g., in the region between 14 797 521 and 14 798 310. An exemplary sequence of this region is as follows:

```

CATTTTGAAAGTGCCCAAGTTGCTGGAACGCTGAAAATTGAAATTATTAACAAAGAAATTTGCTTTAAAA
TCCGAAAAATCAAGAAAAAATCGATAATTCGTCTGGACAATCCGCCTGCTAGCACGGCTTGACGCTCGTT
TGCCGCGCGCTCATTCGATTTGTGTGAGTGCCAGTGGAGCGCGTTTGCTAAGGCTAACTGTGTAGTCCT
CTCGGACAAGATCTGTGAACATTGAAATGAAACACTTGGGTTCAATAAAATCACAAGAAAATGATGACAA
                                     -518
TTTGTGTTGCGACCGAAAAAAATTATAAAATTGAATATTGGTTATCATCGTTTCAATCTTTGTTTTGT
                                     -469
ATTAAAGGCACAGCTGCTAAAAATTGTTTTTTTTTTTCAATTTTGCTAAAAGAAAATCAATTTTCTGAT
TTTTTGTTGAGTTCCCGTGCAAATCAATGTCCTAGCTTTTTTAAAATTGTTTTTTGTTATGTAATTCTAAT
CAAATTTTGTGGAATTTTCAGAGATTTTCTGCTAAACACTAAAAATAGTCTAAAAGTCGATAATTTGAT
AAACATTTACTCAAACCTTTTACGGAAAAATGAAACAAAAGTTGCAAAAATATAGTAATTTTCGCAATTTT
CTGAACGCGTACTTAAAGGTACACGGTTTGATTCTGGATTGGTCCCGCCACAAAGTGTTACCATAACATTT
TTCTCGCTGCGAGACCCATCCGAATAAATCCGTGCGCCTAATCAGTGCGAGTACGCATTTTCATATTACTG
ATAAGTGCCATTTTGTAGAACAATG

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FIG. 9

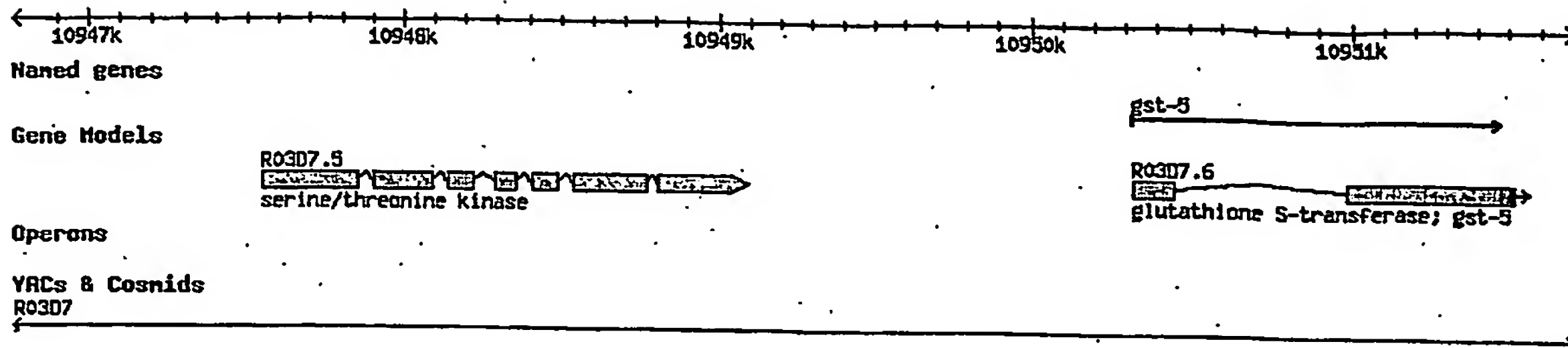
## Exemplary F39B2.3 sequences:

Amino Acid Sequence							
MSKSICKSSM	RAAVVRRFGA	PDVIEAVESD	MPRLEKNQVL	VRNYAAGVNP	VDTYIRAGQY	GKLPNLPYVP	GKDGAGFVEL
VGESVKNVKV	GDRVWYGSEA	DSTAHEYVAVN	RPFELPEGVS	FEEGASLGVP	YLTAYRALFH	LAGAKTGDVI	LVHGASGGVG
SALMQLAAWR	NIEAVGTAGS	ADGIRFVKSL	GARNVYNHSD	KQYVSKMKND	YPGGFNHIFE	MAAHTNLNTD	LGLLAPRGRV
AVIGNRAETT	INARQLMVTE	GAVYGVALGM	SSEAELLDFG	INIVSFLKET	EFRPLINKLY	RLEQLGLAHE	EIMNNKGAKG
NLVVQIEH							

Spliced mRNA							
ATGAGCAAAT	CGATTTGCAA	ATCAAGCATG	CGCGCAGCTG	TAGTCCGACG	ATTCGGAGCA	CCTGATGTCA	TAGAAGCCGT
CGAGAGTGAT	ATGCCCAGGC	TTGAAAAAAA	CCAGGTTCTC	GTTCGGAATT	ACGCTGCCGG	TGTCAATCCA	GTTGACACAT
ATATTCGTGC	TGGTCAGTAT	GGAAAACTAC	CAAATCTTCC	ATATGTACCA	GGAAAAGATG	GAGCCGGATT	CGTCGAACTT
GTGGGAGAAA	GCGTTAAAAA	TGTGAAAGTC	GGCGATCGAG	TCTGGTATGG	ATCAGAAGCG	GACAGTACAG	CAGAGTATGT
TGCGGTGAAT	CGACCATTCT	AGTTGCCGGA	AGGAGTTTCG	TTTGAGGAAG	GAGCTTCTCT	CGGAGTGCCT	TATCTTACCG
CTTATCGTGC	ATTGTTTCAT	CTTGCTGGTG	CAAAGACTGG	CGACGTTATA	CTTGTACACG	GAGCATCTGG	TGGAGTGGGA
AGTGCACTGA	TGCAGCTGGC	TGCCTGGAGG	AACATTGAAG	CTGTTGGCAC	TGCTGGATCT	GCTGATGGGA	TCCGGTTCGT
GAAGAGTCTT	GGTGCACGGA	ATGTCTATAA	TCATTCGGAT	AAGCAATATG	TGTCGAAAAT	GAAAAATGAT	TATCCAGGAG
GCTTCAACCA	CATTTTCGAA	ATGGCTGCTC	ACACAAATCT	GAACACGGAC	CTCGGATTGC	TGGCTCCACG	TGGTAGAGTT
GCAGTAATTG	GAAATCGCGC	CGAGACCACG	ATCAACGCAA	GACAACTTAT	GGTTACAGAA	GGAGCTGTTT	ACGGTGTAGC
ATTGGGAATG	TCTTCCGAGG	CTGAGCTCTT	GGACTTTGGC	ATCAACATTG	TCTCATTCTT	GAAGGAAACC	GAGTTTCGTC
CACCTATAAA	CAAATTGTAT	CGTCTCGAGC	AATTAGGACT	GGCTCATGAG	GAAATTATGA	ACAACAAGGG	AGCGAAAGGA
AATCTTGTAG	TGCAAATCGA	ACATTAAAttc	attatttttaa	cacgccattt	aaaggaa		

FIG. 10

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The R03D7.6 gene is located on chromosome II. Regulatory sequences can be found e.g., in the region between 10949088 and 10950317. An exemplary sequence of this region is as follows :

AGAACTTTTCGAGAAGTCTACCGTTGTAGTTTTCGAAATAGTAATTTATTTAGTGACGTTTATAAAGGTTTACATGATTT  
GGTTTGGAAATTTTGTAGGAGTTTATTCATAAAAACAAAGTAACCATGGACATTCCAGAAGTCTATAGTACACGCGATCC  
TACCGTACCCTTCAGTATTTCTATCAGATTGATAGCTTTCGGTAGTCAGGTACAGCCTAAAAAATTCCTGCTTGCCTTTT  
TGCCTACATGTCTGCCTACCTTCAGTCATAATGCCTACATAATG

-947

ATTTTTTCCAATTGAACTTGCAGACAGAAATTCAAATGGCAAAAAGAAACAAACACCGAAACATTAATCA

CATTTCTTTTCATATCAGTTTTCCTGTCAAAGCACATTTCTGGAGTCTGTGTGATTTTTTTTGTGTCTTTATGTGATCGG  
TGTTGTGAAATTTGTAGTTGATGTTGATAACATACTTTTTTTTGGAAACAAAAGTGATTTGATTAGGCTTGAATTCAGAGA  
TATGTTTCGTGATACTTTGCGATTCTCGAGCCAAAACACGGTATCCGGTCTCGACACGACAACTTTTTCGCAAAATACAA  
GCTGATGTGCGCCTTGAAAGAGTACTGTAATTTCAACCTTTCGTTGTTGCGGAATTTTCATAGTTTCTCGTTCAAAATAT  
ATGTATTTATTAACAAAAAATAAAACAAAACAATTGAGAACACATAAATTGTGAAAAATCAATGAGACCACAGCAAAA  
AATTTTGTATCTACAGTACTCTTTAAAGGCGCACATCCGTTCTTATTTTCAGCAAAAATGTCGCTTCGAGACCGGGTACC  
GTATTTTTTTTTTGTGCAAACTTTAGGTCTAGGTAATATTAATAAAAAAATTCACAAAACCTAGAATCTAGAGCTTTCCAT  
TAAATTTTTTGTATGACATTTGAAAATTCATGATGATTTTTTTTCCAACAATTTTCGAAATATCCCTCTTTTCACCTGGTCC

-302

-282

ACTGAATTCTCTTTCCGAAAGACCACCACAATTTTCAGGGCTCCGCCCATTTCGTGGTTTGTAGCCTTCCCGACCCTACGT  
TTTTGATGACAATTGTGAGAGAAGTGAGAGGTTTCAGACACAAAAGCGACGTGGTTCGAATGA

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GTATAAATAGAGAGTGAAGTTTCCAATTTCCCTCACAATTGTTTGTGTTGCAATCCACTTTCCAACAAAACACAACCTCAA  
TCAAAAATCATTATGGTT

FIG. 11

Exemplary R03D7.6 (gst-5) sequences:

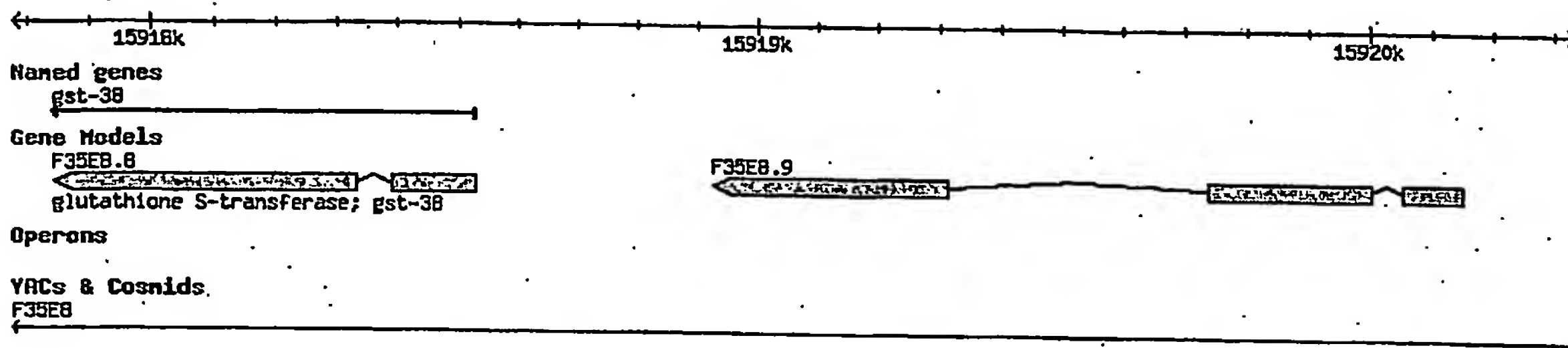
### Amino Acid Sequence

MVSYKLTYFN GRGAGEVSRQ IFAYAGQQYE DNRVTQEQWP ALKETCAAPF GOLPFLEVDG KKLAQSHAIA RFLAREFKLN  
GKTAWEEAQV NSLADQYKDY SSEARPYFYA VMGFPGDVE TLKKDIFLPA FEKFGFLVN FLKASGSGFL VGDSLWIDL  
AIAQHSADLI AKGGDFSKFP ELKAHAEKIQ AIPQIKKWIE TRPVTPF

### Spliced mRNA

ATGGTTTCCT ACAAGTTGAC CTACTTCAAT GGACGTGGCG CTGGAGAAGT GTCTCGTCAG ATTTTCGCCT ATGCCGGACA  
ACAATACGAG GATAATAGAG TCACTCAGGA ACAATGGCCA GCATTGAAAG AAACCTGCGC TGCTCCATTC GGACAACTTC  
CATTCCTCGA AGTCGACGGT AAGAAGCTTG CTCAATCCCA CGCGATTGCT CGTTTCTTGG CTCGTGAGTT CAAGCTCAAC  
GGAAAAACCG CCTGGGAAGA GGCTCAAGTG AACTCTCTTG CCGATCAATA CAAGGATTAT TCAAGTGAGG CTCGTCCATA  
TTTCTACGCT GTCATGGGAT TCGGTCCAGG AGACGTTGAA ACTTTGAAGA AAGACATCTT CCTTCCAGCA TTTGAAAAGT  
TCTACGGATT CTTGGTCAAC TTCTTGAAGG CTTCTGGGATC CGGATTCCTT GTCGGAGACT CTTTGACCTG GATTGACTTG  
GCTATTGCCC AACATTTCAGC TGATTTGATT GCCAAGGGAG GTGATTTTCAG CAAGTTCCCA GAGCTCAAGG CTCATGCCGA  
GAAGATCCAG GCGATTCCAC AAATCAAGAA ATGGATCGAG ACCCGTCCAG TCACACCATT CTAAatagct gtataaaatc  
tgcaaataaa tatTTTTTTTT tttt

FIG. 12



The F35E8.8 gene is located on chromosome V. Regulatory sequences can be found e.g., in the region between 15 917 841 and 15 918 925. An exemplary sequence from in or around this region is as follows:

TCTCATTCTCTTCAAGACATAACACAACGGGCTGACGACCATATCATCAACGACGATTTTTTAGGAACTG  
TACTTTATCTGTGTCTGACCAACACGTGTGAATGAAGTTTCAACTGGAAAATTTGTTTGAAACACTGCAA  
AGAATTTCGAATTTTGATGATAATTTTAAATGCCATTATCAGTTTTAATACGCCACTCTAGTCTTTGATT  
-240

CTTTGCACACACACACACACACACACACACACACACTCACAAACACGCCTGAAATTTGCAATATG  
CTGATTTAACGAGAAAACATTTGATGACAATAAACTTGGCGTATTAATATAAAAGGGAAAATTCAATTCA  
-94

GATTCTCAACGGTTTATTTTCTGTCACAACCTCTTCCTAATATTCACCATGGTTT

FIG. 13



Exemplary F35E8.8 (gst-38) sequences:

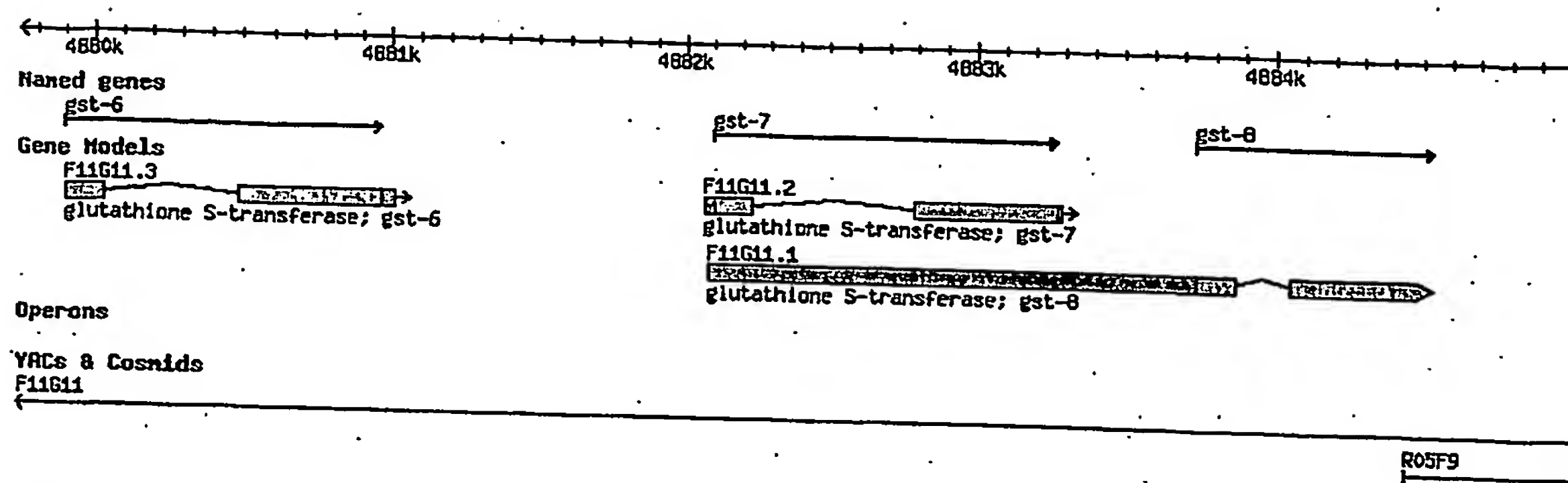
### Amino Acid Sequence

MVSYKLTYFD GRGAGELCRQ IFAAAEQKYE DNRLTDEEWE KFKAAAGKTPY NQLPMLEVDG KPLAQSHAMA RYLAREFGFN  
GKSRWEEAQV NSLADQYKDY YAEARPYLAV KLGYTEGDAE ALYTSVYLPV FKKHYGFFVN ALKASGSGFL VGNSLTFIDL  
LVAQHSADLL GREKSDLFND VPENKAHSEK VQSIPQIKKW IETRPASDW

### Spliced mRNA

ATGGTTTCCT ACAAGCTTAC CTACTTCGAT GGACGCGGAG CCGGAGAGCT CTGCCGTCAA ATCTTTGCTG CCGCCGAGCA  
GAAATATGAA GATAACAGAC TTACCGATGA GGAGTGGGAG AAGTTCAAAG CGGCCGAAA AACCCATAC AACCAGCTTC  
CAATGCTCGA GGTAGATGGC AAACCACTCG CTCAGTCCCA CGCGATGGCT CGTTATCTTG CTCGGGAATT CGGGTTC AAC  
GGAAAGAGCA GATGGGAAGA AGCTCAAGTC AACTCCTTGG CCGACCAGTA CAAAGACTAT TACGCGGAGG CTCGTCCATA  
CCTCGCTGTG AAGCTTGGTT ACACAGAAGG AGACGCGGAG GCTCTTTACA CAAGCGTCTA TCTTCCAGTT TTCAAGAAAC  
ACTATGGATT CTTTGTCAAT GCTTTGAAGG CCAGCGGGTC AGGATTCTTG GTTGGAAATT CCTTGACTTT TATTGATTG  
CTTGTTGCTC AGCATTACAGC TGATTGCTG GGACGTGAAA AGTCGGATCT TTTCAATGAT GTCCCAGAGA TGAAGGCACA  
TTCCGAAAAA GTTCAGTCAA TTCCTCAGAT CAAGAAATGG ATTGAGACTC GTCCAGCGAG TGACTGGTAA

FIG. 14



The F11G11.2 gene is located on chromosome I. Regulatory sequences can be found e.g., in the region between 4 880 968 and 4 882 068. An exemplary sequence in or around this region is as follows:

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AATTGAAATGAGTTTGCAATTTTGTATTATTTTAAATTCATATTTCAAGAAGCAATTTTGGCTAATTTGTTTTAATGG
AAATCGATGTTTCTAAATATCTTGAATGAATTGTTCTTTTAAAAATTTTATGGTAAAGTTTTCAGCAGGATGTTTCTAT
AGAAGCTTTTGCATTGCAAGAGTGTTGAAATATACAGGATATTTACAAAAGCCTGGGAAGTAGGCATGCTTTTAGGTAC
AAATCAGACCTACACCGCCTTCCTTTGTGGTTTACCATCATAGCTAAACTTTCCGAACATTCCCTGGTGAGACACAATG
TTCAAAGCACAAAACCAATCACGTCATAATGTTAATTTGACTTTTATTGTCAAAAATTACAAAAGCGTCGTTTTCTGGAA
CATGAACATAATAAGAATTTTCAAATTTCCGTGGGCACAATAAATATGTAATCTTTTATTTATTTTGGAGGATAGTCTT
TTCAAAGGCAGGTGTATAACCTCAAAGAAAGCACGTTTGTGTTTCAAAGTGAGACTTAAATTATTTCAAAGACAAATT
CCATAGGAAATCATTGTTTCATCAGGCACCTTCCCAGAAATTAGGCTGTAGGCAGGCACGTAGGCTGCGGTAAATGCCTAC
GCCTCTTTTGC GCGAGATTATGAAATTGTGTTGTACTGTCGGAAAAATTT CAGAAACAAAAAAATATTTTTTTGTGACT
TTTTGTGTCAGTTATAGTAGTTTCTTATCATGGTATCTTCAATAAATGGCAAGCGTAAC
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AAGATGATTGATGCCATGGGTTTATATTTGTGAGTAGTCACAAATTGTGACACAACATTCCCTTCGAAAGATCTGGAAAA
GTCACAAAACCTTGCATATATTTTTTTCAACCAATATTATTTTGACCTACTCTGTTTCATCGTAACATTGCAACAACAAAA
AACGATGACTACACTTTATGATTTCTAGTCAACAACGTGCGCGCAATGTGTAGAGCAAATGATGACAAACTACAGAATAT
GGTGAGTGGAGAGACGACAGACATTTGAGAAATGGGTATAAATA
-133

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GAGACGGCCGGCATTTCAGTGTTCAACCCTTCTCATCGACCACTCGATTTCTTGCTTGGTTATTTCAACAATG

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FIG. 15

Exemplary F11G11.2 (gst-7) sequences:

Amino Acid Sequence									
MVHYKVSYPF	IRGAGEIARQ	ILAYAGQDFE	DNRIKKEEWP	AVKPSTPFGQ	LPLLEVDGKV	LAQSHAIARY	LARQFGINGK		
CAWEEAQVNS	VADQEKDYLN	EVRPYFMVKM	GFAEGDLDAL	AKDVFLPGFK	KHYGFFANFL	KSAGSGYLVG	DSLTFVDLLV		
AQHTADLLAA	NAALLDEFPO	FKAHQEKVHS	NANIKKWLET	RPVTPF					

Spliced mRNA									
cgaccactcg	atttcttgct	tggttatttc	aacaATGGTC	CACTACAAGG	TATCGTACTT	CCCAATTCGT	GGAGCTGGAG		
AGATTGCTCG	TCAGATCTTG	GCCTACGCTG	GACAAGACTT	CGAGGACAAC	AGAATCCCAA	AGGAGGAATG	GCCAGCTGTC		
AAGCCAAGCA	CTCCATTCGG	ACAGCTTCCA	CTCCTTGAAG	TTGACGGAAA	GGTTCTTGCC	CAATCTCATG	CTATCGCCCCG		
TTACTTGGCT	CGTCAGTTCG	GAATCAATGG	AAAGTGTGCA	TGGGAGGAGG	CTCAAGTCAA	CTCGGTTGCT	GATCAATTCA		
AGGATTACCT	CAACGAAGTT	CGTCCATACT	TCATGGTGAA	GATGGGATTT	GCTGAAGGAG	ATCTCGATGC	TCTTGCCAAG		
GACGTCTTCC	TTCCAGGATT	CAAGAAGCAC	TATGGATTCT	TTGCTAACTT	CCTCAAGTCG	GCTGGATCCG	GATACTTGGT		
TGGAGACTCT	TTGACCTTTG	TCGACTTGCT	CGTCGCTCAG	CACACTGCTG	ATCTTCTGGC	TGCCAACGCA	GCTCTTCTCG		
ATGAATTCCC	ACAATTCAAG	GCTCATCAGG	AAAAGGTTCA	CTCGAATGCC	AACATCAAGA	AGTGGTTGGA	GACTCGTCCA		
GTTACTCCAT	TCTAAatgat	ttcca							

FIG. 16

The K08F4.7 gene is located on chromosome IV. Regulatory sequences can be found e.g., in the region between about 10141800 and 10142217. An exemplary sequence of this region is as follows:

ATTATCCAAAAAGATTAGAAGTTGGCAAACCTTGGGCAAGAATTTCCAGAGATTGCACTAAAGTTGTAGCCAAGTTTGAT  
CCAACCTTTATCCAATCTTTTACTAAAATTATCCTTAAGACTATTTAAATTTTAGATAGAGAATTGGCGAGAGTTAGATCC  
CACTTGGATATGACTTATAGTTAGCCTAACCTGAAGCTATTGCTTGCTTGATCATTGGTTTATCGCTTTGCTACTTGGA  
TAACCAGCTCCAATAGTTGTTATTTTTGCTTTTGTGCATCATTTT

-157

TCCACGATTTACACTCTCAAGTGAAACCAACTGTTCTTTGATGCCAGACGATGACATTACACTTGATAAGA

-83

AAATATATATAAACTGGAATTAAAAACAATTGATACATCGATTCAATTACTGAATTCTAATTATG

FIG. 17

Exemplary K08F4.7 (gst-4) sequences:

### Amino Acid Sequence

MPNYKLLYFD ARALAEPIRI MFAMLNVPYE DYRVSVEEWS KLKPTTPFGQ LPILQVDGEQ FGQSMSITRY LARKFGLAGK  
TAEEDAYADS IVDQYRDFIF FFRQFTSSVF YGSDADHINK VRFEVVEPAR DDFLAIINKF LAKSKSGFLV GDSL TWADIV  
IADNLTSLK NGFLDFNKEK KLEEFYNKIH SIPEIKNYVA TRKDSIV

### Spliced mRNA

ATGCCAAACT ATAAGCTATT GTATTTTGAT GCTCGTGCTC TTGCTGAGCC AATCCGTATC ATGTTTGCAA TGCTCAATGT  
GCCTTACGAG GATTATAGAG TTTCAGTGGA AGAATGGTCA AAGCTGAAGC CAACGACTCC ATTTGGCCAG CTTCCCATTT  
TACAAGTCGA TGGAGAACAA TTCGGTCAGT CAATGTCTAT CACAAGATAC TTGGCAAGAA AATTTGGACT CGCTGGAAAA  
ACTGCAGAGG AAGAAGCTTA CGCTGATTCA ATTGTAGATC AATACAGAGA TTTTATATTC TTTTCCGTC AATCACTTC  
TTCCGTTTTT TATGGAAGTG ACGCTGATCA TATTAACAAA GTACGTTTTG AAGTTGTTGA ACCAGCCCGT GATGATTCT  
TGGCAATAAT CAATAAGTTC CTGGCCAAGA GTAAATCAGG ATTCCTCGTT GGAGACTCAT TGAATTGGGC TGATATTGTG  
ATTGCTGACA ATTTGACAAG TCTCCTGAAG AATGGATTCT TAGATTTCAG CAAAGAAAAG AAGTTGGAAG AGTTCTATAA  
CAAGATTCAT TCAATTCCAG AAATTAAGAA TTACGTGGCA ACAAGAAAGG ATAGTATTGT TTAAaatcga attatttaag  
tctgaattat gtatgtagta aaataatata gttcctatca cgtctcccag agagcgtaat aaattattat tatgtg

FIG. 18



The *sod-1* gene is located on chromosome II. Regulatory sequences can be found e.g., in the region between about 6 973 806 and about 6 974 406. An exemplary sequence of this region is as follows:

```
ATTCCGCAACCCCGTCAAATTTAAGAAGAGAAAGAAAAAAACACAACGTGTTTGACCTGTAAGGTAGT
TTTTTTTTGTTGCCTTCGGCGTTTTGATTCACATGAAAGTTTCTACGGAAAACTTTCATTGCATAACGA
TCTTCATATCTTGTTTCTGGAAACGAAAATTTCCAACATGAAAGAAACCCGACGCTATTTATTCTCGCAA
CACAAAATTTACATTTAAATAACCGCGGTTTTTCTCGAACAGCATATTTGACGCGCATTGCTCGTCAA
GTTTGATGCGTGACACTATTTTGCTGTTGTTTTTTTTCTTTTTCTCTAAATTTTCTTTACGCTTTCGTA
GTTTCTATAGAAACGATTCTCCACTCCCGGTTTTCTTCCGATTCTCAAATTAATTAATAATTTAGTTATT
AAAAATCCTTTTTCTTGAAATAATCGTTCAATTTGAGTTTTCAAGAGTGGAGACGTTGAATTTGTGAGC
CGCTTATTTTTTCTGTGTTTTTGTGTTTTTAATCAGTGTCATAATCATACTTTCCATTGTTTCT
```

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```
TTATTATTCAAAGTTGTAGATTGAGTATTTTAGATCGGTGATG
```

FIG. 19

Exemplary sod-1 sequences:

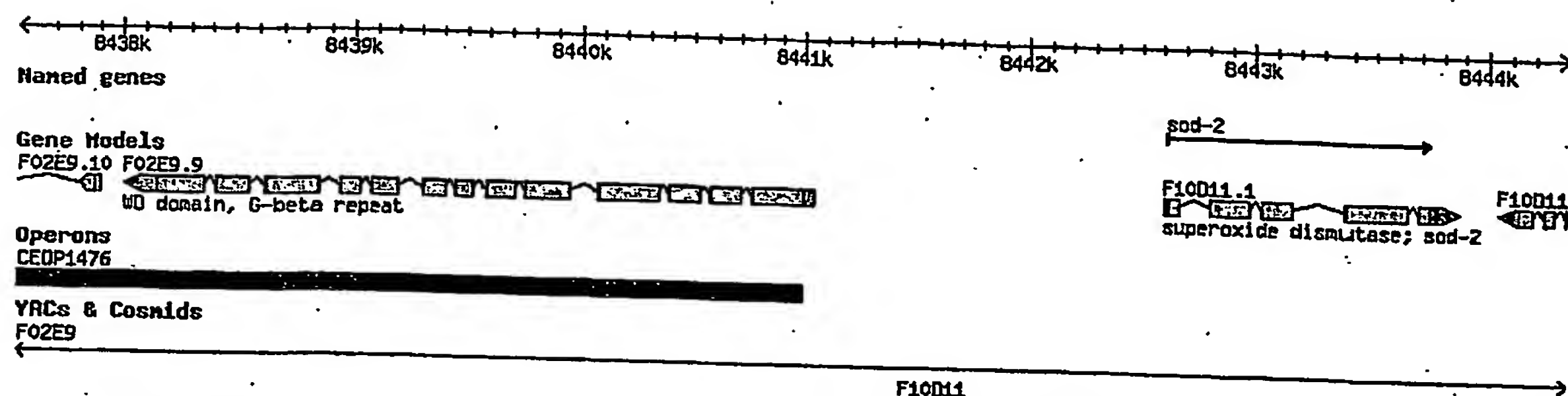
### Amino Acid Sequence

MEFNLLTQVS NAIFPQVEAA QKMSNRAVAV LRGETVTGTI WITQKSENDQ AVIEGEIKGL TPGLHGFHVH QYGDSTNGCI  
SAGPHENPFG KTHGGPKSEI RHVGDLGNVE AGADGVAKIK LTDTLVTLYG PNTVVGRSMV VHAGQDDLGE GVGDKAEESK  
KTGNAGARAA CGVIALAAPQ

### Spliced mRNA

tttagatcgg tgATGTTTAT GAATCTTCTC ACTCAGGTCT CCAACGCGAT TTTTCCGCAG GTCGAAGCCG CTCAAAAAAT  
GTCGAACCGT GCTGTCGCTG TTCTTCGTGG AGAAACTGTT ACCGGTACTA TCTGGATCAC ACAGAAGTCC GAAAATGACC  
AGGCAGTTAT TGAAGGAGAA ATCAAGGGAC TTACTCCCGG TCTTCATGGA TTCCACGTTT ACCAATATGG TGATTCCACC  
AACGGATGCA TTTCTGCCGG TCCACACTTC AATCCATTTG GAAAGACTCA TGGTGGACCA AAATCCGAGA TCCGTACAGT  
AGGCGATCTA GGAAATGTGG AAGCTGGAGC CGATGGAGTG GCAAAAATCA AGCTCACCGA CACGCTCGTC ACGCTTTACG  
GTCCAAACAC TGTCGTTGGC CGATCTATGG TTGTTTATGC CGGACAAGAC GACCTCGGCG AGGGAGTCGG AGACAAGGCA  
GAAGAGTCCA AGAAGACTGG AAACGCCGGA GCTCGTGCTG CCTGCGGTGT CATTGCTCTC GGTGCTCCCC AGTGActacc  
tgaatcgcg ctctgaatct ccacacaatt cctactaaag acaatttttc atttcttgct ttgtcggtat attcttaaga  
atcccgttgt tcctactcct actactgtat attttcacat aaaattttctt caaaatttca aataaagggt gtagtttc

FIG. 20



The *sod-2* gene is located on chromosome I. Regulatory sequences can be found e.g., in the region between about 8 441 038 and 8 442 612. An exemplary sequence of this region is as follows:

TGAATAAAAACGTTGAACCCAACGGACATCAAAGTATCAAAGTAAGTAAGTAAGTAAGTAACCTGAATAAAAACGTTGCA  
TATAAAAATCTACTCGAAAATTAAGTGAGAATTGAAGGATTGCTTTCCGAAGAGAAAATGACAATTATAGGGTATACTA  
AAACATCAAAAATGTATATTAGACTACCATAAATATAAAACATCAGTGCTGCTCTCCAAGCTATTCTGACGGATTGCGAC  
AACGAGCTCGCTGGAGTTGGCATCAGTGTGGAAGGCAGACACATAAGAAGACTCGAATTTGCGGATGACGTAGTCCTGAC  
ATGTTCCACACCGGGAGAAGTTCAAGAACGACTGGAAATTTTGGACCGAATAAGTTCTAATTACGGACTCAAGATCAATC  
AGTCAAAGACTGTTCTTCTGAAGAACAAGTTTGGCCGAGCCAAGACGTCCTTTTCAACGGATCCCCATCATTCCCGTG  
CCTGGTTGCCGCTATCTGGGTCGCTGGATCGACATTTCTGGCTCAATTGACGAAGAGATCTCGAGGAGAATAAGAGCAGG  
TTGGGGTGCTCTGGTTGGAATCAAAGAAGTCTTGAGAATCATGCCAAACAAGGAAAGAATCATCCTCTTCAAGCAAAAT  
-980 -959

GTGCTACCAGCTCTCCTGTATGCTAGTGAACTTGGACTTGTAATGCTGGATCCACGTTGAGACTCAAAGAACTGTCAC  
CGGTCTCATCGACGCTGCAGAAATTCGAGGCTGGAACCTTCAACTTGGAACGTTACCTCCTTGCAAAACAATCAAGATTTG  
CAGGACACATTCTACGGAGAGATCCAAACCGATGGACAAAATCTGCACGGAATGGGACCCGAGCCACAACAAAATTTG  
AAACGTGCCGTTGGAGGACAGAAGAAGAGATGGGCTAAGGACATCGACGAAGAATACGCAAAATTCACCACAATTCGCG  
CATGTCCGGGACAAGTCGTTGTTGGGAGAAGAAGACTAGGAATGCTCACTCCGAAGGCTCCATGGCTGTCCATCGCACGAA  
CCGACCGTGAAAAATGGAAAGAGTTTGTCCGCAGTTGCCTCGCAACTTGAACCCAACGGACATCAAAGTATCAAAGTAAG  
TAAGTAAGTAAGTAACCTGAATAAAAACGTTGCAATTAAAAATCTACTCGAAAATTAAGTGAGAATTGAAGGATTGCTT  
TCCGAAGAGAAAATGACAATTATAGGGTATACTAAAACATCAAAAATGTATATTAGACTACCATAAATATTACGATAAT  
-363

TTAAAAATTACTAGAAACACGCAATTCGGCTCAAAAAGCAACAATTTAGACTGAAAACGAGCTAAAAGAATATTATTCAA  
AAACCACTTTGCTCGGTAAATCTGGTGTATCATGTTCCGCAAAACACTGTCTTTTGTGTTTGGC  
-191

TACTTTGTTTACGCGCATTCGAATTTCAAGTGTTCGCGCTTTTGTGTTTACTTTTTTATTTTTTCATCCAAAATCGTATTTT  
CAGCTTGATATGTTTCTGCGAATTGTAAAAATTTATATTTGACTATTGAATATTTTAATTATTTGCAGCCGAAAATG

FIG. 21

Exemplary sod-2 sequences:

### Amino Acid Sequence

MLQNTVRCVS KLVQPITGVA AVRSKHSLPD LPYDYADLEP VISHEIMQLH HQKHATYVN NLNQIEEKLH EAVSKGNVKE  
 AIALQPALKE NGGGHINHSI FWTNLAKDGG EPSAELLTAI KSDFGSLDNL QKQLSASTVA VQSGSGWGLG YCPKGKILKV  
 ATCANQDPLE ATTGLVPLFG IDVWEHAYYL QYKNVRPDYV NAIWKIANWK NVSERFAKAQ Q

### Spliced mRNA

tttgcagccg aaaATGCTTC AAAACACCGT TCGCTGTGTC TCAAAGCTTG TTCAACCGAT CACAGGAGTC GCTGCTGTTC  
 GCTCGAAGCA CTCGCTGCCA GATTTACCAT ACGACTATGC TGATTTGGAG CCTGTAATCA GTCACGAGAT TATGCAACTT  
 CATCATCAA AGCATCATGC CACTTATGTG AACAATCTCA ACCAAATTGA GGAAAAGCTT CACGAGGCGG TCTCCAAAGG  
 AAACGTCAA GAAGCTATCG CTCTTCAGCC AGCTCTCAAG TTCAATGGAG GAGGACATAT CAACCACTCC ATCTTCTGGA  
 CTAATTGGC AAAGGACGGA GGAGAACCAT CGGCGGAGTT GCTCACC GCA ATTAAGAGCG ACTTCGGATC TCTGGATAAT  
 CTTCAAAAAC AGCTTTCGGC ATCAACTGTC GCTGTTCAAG GATCAGGATG GGGATGGTTG GGATACTGTC CAAAGGGAAA  
 GATCTTGAAG GTTGCCACAT GTGCCAATCA GGATCCACTT GAGGCAACAA CTGGACTTGT TCCACTGTTC GGAATTGACG  
 TCTGGGAGCA CGCTTACTAC TTGCAGTACA AGAATGTTCG ACCAGATTAT GTCAATGCTA TTTGGAAGAT CGCCAACCTGG  
 AAGAACGTCA GCGAGCGTTT TGCAAAGGCA CAGCAATAAa tgagctgaat cacaagaatt aatcgtcaaa tgtagcagta  
 gaagttgact cccattgttt tgtaactatt tttgtttcct aattatttcg aaatgtaa at tttcaaacct tttcaaatga  
 aaagttttca ccg

FIG. 22

The *ctl-1* gene is located on chromosome II. Regulatory sequences can be found e.g., in the region near 14 306 135. An exemplary sequence of this region is as follows:

AAAAAAAAAATCGATAAAAAATCCGCGTCAACGAAAGTTTAAAGTTACAGTATTTGTCGTTTCGAGACCGG  
 GTACCGTAGTTTTTGGTGAAAACATTGCAAATTTGGTCAACAATTCATCGCTGCGAGACCGACACAAC  
 ACTTTATTTTATTTTGGGTTTCCCTTATCGCTTATCATAAACATGTGACGTCATCATCTCTGTACAGA  
 -997 -978

GCACCGCGACTGGGAGTATAAGAATCGCCGAAAACATCAATAATCAGTTCGGTAGAAGTGA AAATTGAG  
CGTAAAATATGATCATTTCGATGCACCATATTTGACGCGCAATACTTCTACAAGCCGCTGTGTACTGC

TCGTGGACAAC TTTGGATTATTT TTTTGT TTTTAA AATTCAAA ATAGTCA ATATATTG CTTATTTA TAGCG  
CGCCTTTT TGACAGTA AGTTTGT CAAATTTG CGCGTA AGTTAT GGTGTTTGC ACATATGC ACCATA CAGC  
AACACCCCG CGGCCCG GCTAGT GGTACAT CCATGCA AATGCG CTCTACT GATAATTTG AGTTTA ACCAGG  
TTTAGGCG CAAGATAA GAAAAA AGCTTT GGACCA AAAAATTTAG AGTTTAT TTTTTTTC GGACAT TTTT  
TATACATC AAAAAATAT TGGGCC ACTCGT TTTTGATA AAAACG ACAAGCCC AAAAGTTC AGGTATA CGG  
TAGACAAAT TGC GTACAGGT ACCACT TTTCCAC GTAGTG CCAGGT TGTCCC ATTACG CTTTGAT CTATGA  
AAAATGCG GGAATTTT TCGTCC AGAAAA ATGTGAC GTCAGC ACGTTCT CAACCAT GCGAAAT CAGTTGAA  
AACTCTGCG TCTATT CTCCCG CATTTTT TGTAGAT CTGTAG ATTTGTAG ATCAATCC ATTCCCC GTATAC  
CCTGACCC ATAATCA ATACCTAC CTAATTT TTTGTCT TTTCCCC TACTTT TTTTGC CTGTCC AAAATA AGCG  
AGACTATG CCGTAGT CTGGTGT CCAACA ACATGTT CCTTAT CAGTGATA ACGCTACA ATCTTCT TTTCTTT  
TTTCTCTG TTTCTCT TGTCTCT CCCAAC CCATATT CCGTATTAC ACCTCG TCGTGG TCATTT TTTTGTTC  
AGAGTTTT ATTTAATT CTAAATTT CCTAACT AAAATTT CAGA

FIG. 23



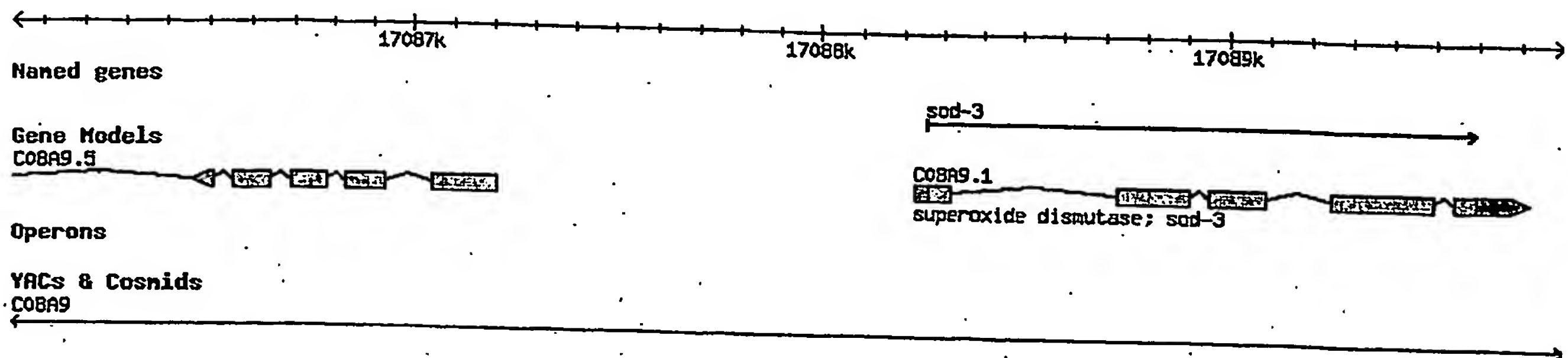
## Exemplary ctl-1 sequences:

Amino Acid Sequence							
MPNDPSDNQL	KTYKETYPKP	QVITTSNGAP	IYSKTAVLTA	GRRGPMLMOD	VVYMDEMAHF	DRERIPERVV	HAKGAGAHGY
FEVTHDITKY	CKADMFNKVG	KQTPLLVRFS	TVAGESGSAD	TVRDPRGFSL	KFYTEEGNWD	LVGNNTPIFF	IRDAIHFPNF
IHALKRNPQT	HMRDPNALFD	FWMNRPESIH	QVMFLYSDRG	IPDGFERFMNG	YGAHTFKMVN	KEGNPIYCKF	HFKPAQGSKN
LDPTDAGKLA	SSDPDYAIRD	LFNAIESRNF	PEWKMFIQVM	TFEQAEKWEF	NPFDVTKVWP	HGDYPLIEVG	KMVLNRNVKN
YFAEVEQAAF	CPAHIVPGIE	FSPDKMLQGR	IFSYPDTHYH	RLGPNIQLP	VNCPYRSRAH	TTORDGAMAY	ESQGDAPNYF
PNSFRGYRTR	DDVKESTFQT	TGDVDRYETG	DDHNYEQPRO	FWEKVLKEEE	RDRLVGNLAS	DLGGCLEEIQ	NGMVKEFTKV
HPDFGNALRH	QLCQKKH						

Coding							
CTGAAAACCT	ACAAGGAGAC	GTATCCAAAA	CCCCAAGTGA	TCACAACCTC	aaaATGCCAA	ACGATCCATC	GGATAATCAA
CGTGCTCACC	GCCGGGCGGC	GTGGCCCAAT	GCTCATGCAA	GATGTAGTTT	AAATGGAGCT	CCGATCTACT	CGAAGACCGC
AACGTATCCC	CGAGCGTGTC	GTTCATGCCA	AGGGAGCCGG	AGCCCATGGA	ATATGGATGA	GATGGCTCAT	TTCGATCGTG
TACTGTAAGG	CCGATATGTT	CAACAAGGTC	GGAAAACAGA	CACCACTTCT	TACTTCGAGG	TCACCCATGA	CATCACCAAG
GGGATCCGCT	GATACTGTCC	GCGATCCACG	TGGATTCTCT	CTCAAATTCT	CGTTCGTTTT	TCAACGGTCG	CTGGAGAATC
GAAATAACAC	TCCGATCTTC	TTCATTCTGT	ACGCAATCCA	CTTCCGAAT	ATACCGAGGA	GGGTAACGGG	GATCTGGTTG
ACTCACATGA	GGGATCCGAA	TGCGCTCTTC	GATTTCTGGA	TGAATCGCCC	TTCATTCATG	CCCTGAAGCG	CAATCCACAG
CTCGGATCGT	GGAATTCCTG	ATGGATTCCG	TTTTATGAAT	GGATACGGAG	TGAATCCATT	CATCAGGTGA	TGTTCTCTTA
GAAATCCGAT	TTATTGTAAA	TTCCATTTC	AGCCTGCTCA	AGGTTCCAAG	CGCATACTTT	CAAGATGGTC	AACAAGGAGG
GCCTCTTCGG	ATCCAGACTA	TGCGATCCGC	GACCTGTTCA	ATGCCATTGA	AATCTCGATC	CAACTGACGC	TGGAAAGCTC
CATTCAAGTG	ATGACATTCG	AACAAGCTGA	GAAATGGGAG	TTCAATCCAT	GTCAAGAAAT	TTCCCGGAAT	GGAAGATGTT
ATTACCCACT	GATCGAGGTC	GGCAAGATGG	TGCTGAACAG	GAATGTGAAG	TTGATGTCAC	TAAAGTTTGG	CCACACGGTG
TTCTGCCCCG	CCCACATCGT	CCCAGGAATC	GAGTTCTCGC	CAGACAAGAT	AATTATTTTCG	CTGAGGTCGA	ACAAGCCGCC
CACGCATTAC	CATCGCCTTG	GACCAAATA	CATTCAGCTT	CCAGTCAACT	GCTCCAAGGG	CGTATCTTCT	CCTACACGGA
AACGCGATGG	TGCAATGGCT	TATGAAAGCC	AGGGAGATGC	GCCGAATTAC	GCCCGTACCG	CTCCCGTGCT	CATACCACTC
CGTGATGATG	TGAAGGAGTC	GACATTTTCA	ACGACTGGAG	ATGTTGATCG	TTCCCGAACA	GTTTCCGCGG	ATACCGTACT
GCAGCCACGT	CAGTTCTGGG	AGAAAGTGCT	CAAGGAGGAG	GAGAGAGATC	TTATGAGACT	GGAGACGATC	ACAACACGGA
GTGGCTGTTT	GGAGGAAATT	CAAAATGGAA	TGGTCAAAGA	GTTCAAGAAA	GGCTCGTTGG	GAATTTGGCT	AGTGATTTGG
CATCAGCTCT	GCCAGAAGAA	GCATTAAatt			GTTTCATCCG	ATTTCCGAAA	TGCTCTTCGC

FIG. 24

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The *sod-3* gene is located on chromosome X. Exemplary regulatory sequences include:

TATTCGCAGAAAAAGTCGTTGCAAACATTCGTTTTTATATGTTTTTCTTTGAGAAAGCGTGGTTCATTT  
 TTGAAAGTGAAAAATATTTGCTTAAACTTCCAAATTTAAATCTGCAGTGATTCAGAGAGGTTGAGAATT  
 ATTTTCAAAAACATTCAATGTTTTCCCTTGGAGTGACTATGCAAATATGAAAATGTTTTCCAAAAATATT  
 TGGATGCCCTGATAAAAAGTAGGTGAAATTTTCGCAGGGGAACATCATATTAAATGTTGAATTTTGTAGAA  
 GAAATGGAAATGTTTGTCTGGTGGTATGCTCGAATATTTGAGATATTATATATTTACTGTTAAATCCGAAA  
 TTTTGGACAAACGGAAAAAATTTGTGTGAAATACTACATTTTCGATAACACAAAGGTACTTCCATAACA  
 CTTATAAAAACGTTTGGACTATCTTATTTTCAGGAAAAAAAATCCAAGAATAAACATTTTTCAGAATTTG  
 AACTTTCTAATGGCTGATTAATAAAACAAAGTTATACAACATTTCAAAGCAGTTGCTCAATCTGGCATT  
 TCTTGTGTTTTTTTTTTGAATATTTTCATCAGCAAGATGTTGATAATTTTGTGTTAATTCTAATTGTTTTCT  
 ACAATTTTCAAACCGAAAAATTGACCTTTGACTTTGTTTACTTTGTTCTCGTGGGTAACTGTTCACTGA  
 TTTCTATTGCTGTTGATGAGGTCCTTGATCAAATTTGTATTGTTTTTATACTGCATATTGCTTCAATTCT  
AAATCATCTAATATATTGTCAAACAACCTTCTTGTTTTTTTTTTTCATTCAAACCTTCTGCAAAAACGTTCT  
 -287

CTTAACAAAGGTTACACAACAACCTCTCCTCTCCATCTCTTTCTCTCAACAACAATGTGCTGGCCTTGCA  
 TGTTTGCCAGTGCGGGTTGTTTACGCGTTTTCAAGATTTTGGTCTCCTATCTAACGTCCCGAAATGCAT  
 TTTTTCCTTTCATTGTTTTTTTCTGTTTCGAGAAAAGTGACCGTTTGTCAAATCTTCTAATTTTCAGTG  
 AATAAAATGCTG

FIG. 25

Exemplary sod-3 sequences:

### Amino Acid Sequence

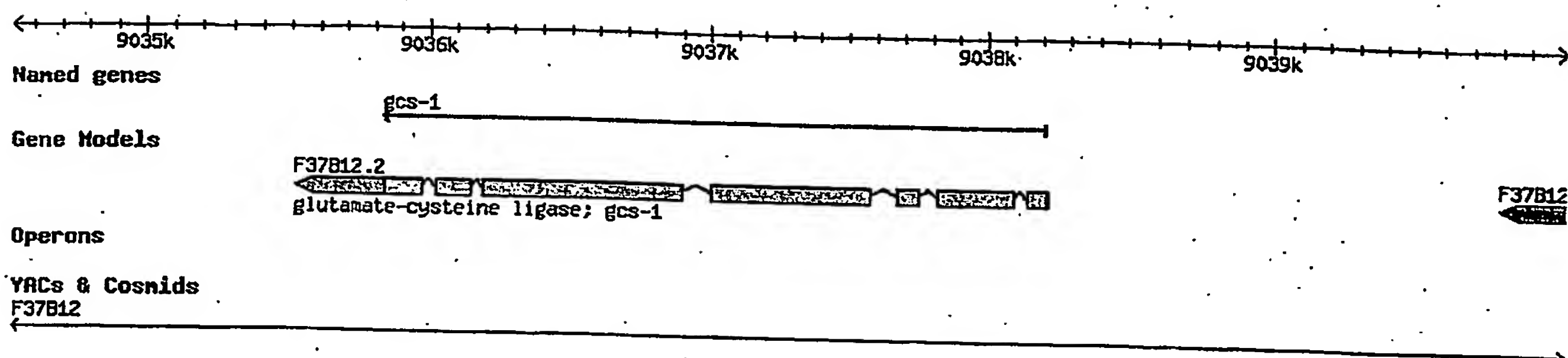
MLQSTARTAS KLVQPVAGVL AVRSKHTLPD LPEDYADLEP VISHEIMQLH HOKHHATYVN NLNQIEEKLH EAVSKGNLKE  
 AIALQPALKE NGGGHINHSI FWTNLAKDGG EPSKELMDTI KRDFGSLDNL QKRLSDITIA VQSGSGWGLG YCKKDKILKI  
 ATCANQDPLE GMVPLFGIDV WEHAYYLQYK NVRPDYVHAI WKIANWKNIS ERFANARQ

### Spliced mRNA

cgtttgtcaa atcttctaata tttcagtgaa taaaATGCTG CAATCTACTG CTCGCACTGC TTCAAAGCTT GTTCAACCGG  
 TTGCGGGAGT TCTCGCCGTC CGCTCCAAGC ACACCTCTCCC AGATCTCCCA TTCGACTATG CAGATTTGGA ACCTGTAAATC  
 AGCCATGAAA TCATGCAGCT TCATCATCAA AAGCATCATG CCACCTACGT GAACAATCTC AATCAGATCG AGGAGAAACT  
 TCACGAGGCT GTTTCGAAAG GGAATCTAAA AGAAGCAATT GCTCTCCAAC CAGCGCTGAA ATTCATGGT GGTGGACACA  
 TCAATCATTC TATCTTCTGG ACCAACTTGG CTAAGGATGG TGGAGAACCT TCAAAGGAGC TGATGGACAC TATTAAGCGC  
 GACTTCGGTT CCCTGGATAA CTTGCAAAAA CGTCTTTCTG ACATCACTAT TGCGGTTCAA GGCTCTGGCT GGGGATGGTT  
 GGGATATTGC AAGAAAGACA AAATCTTGAA GATCGCCACC TGTGCAAACC AGGATCCTTT GGAAGGAATG GTCCCACTTT  
 TTGGAATTGA CGTTTGGGAG CACGCCTACT ACTTGCACTA CAAAATGTC CGCCAGACT ATGTCCATGC TATTTGGAAG  
 ATTGCCAACT GGAAGAATAT CAGCGAGAGA TTTGCCAATG CTCGACAATA Aaagcaggaa atattggaat tttcggtttt  
 acgaaaatat tgaagataat tcagatgtag tttaaaacgc tgagaatttg tattttttgta attgttttaa taaaagaacg  
 cacagttttt tctta

FIG. 26

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The *gcs-1* gene is located on chromosome II. An exemplary regulatory sequence is:

TTATCAACCACTAGGTTCCGTCTTAATCGTCCAAATATTGATCCGCTCGCTCGTGTTTTCTCAACTTCTTTATTTGCTGT  
 GTTTTCTGTTTCTATAGTTCTCCATTTTCCATCTCCTCTTCGCTTGTTGAATGGACTTTATTTTGATAAGTTCATTTTA  
 ATTTTCTAACAATCTCATCACTAGCTCATGATGACAATTGCAAAGAAATTCGTCATATAGAGGGGAAAAATGCTGACAA  
 -607

ATATTGAAAAGCCTTCAGGAGAGATGTAGAGACGTAGGAGTAGAGACAGAACATAAATTTGAGAAGCTTGTAGGGAGAAT  
 AGACATAGAGTTACCATGGGAAAAACGCTCGCATTTTCCATTTAACGAGATTTTCTAGATCACAACATTTTGTGATCCGT  
 TGTGCGAAAATCAAGCTTTTATCAAACCTTTATCGTCTGTTTCATTCTTTCTGACAATCTTTATTATCTTATTAACTTG  
 ACTAATTGTATTGAAAGTATTTTTTTAGATGCGAACGAAGTTCCATTTTTCATGACTTAACATCTCTTAACGTTAGTGAA  
 -316

ATTTTGAATTCCAATTAGGACTACGGTAGGAGTTCTGTAGTTGATTTCTGAACACTTGTTTTGTAACCTTTCTGAACG  
 GATTTTAATATTTCTAAAATTTTAAATTGCAAATCTGAGTCCTATTAAAAGATGTTTCATCCGTAAAACCAACAAACAAA  
 ATATCACTTTATCATCATGAGATTTAATGTTTCCTTTTGATTTTCTGAATTGTTGTACTTTCCTTCAAACGACTTATTGA  
 -121

ACTGATGTAACTTTCCTTCTAATGTTATCATTGTATTTTTTGCAGAATG

FIG. 27



## Exemplary gcs-1 sequences:

Amino Acid Sequence							
MGLLTGKSPL	TWAETVPHID	YIKKHGIAQF	INLYHRLKSR	HGDQLKWGDE	IEYTIVKFDD	ANKKVRVSCK	AEELLNKLQA
EEQVNAMLGT	ANRFLWRPEF	GSYMIEGTPG	MPYGGLIACF	NIVEANMKLR	RQVVKLLKK	DETCLSFSP	SLGVPGFTFP
EVAADRKNDD	AANSVFWPEQ	AVFLGHPREF	NLTKNIKGRR	GSKVAINVPI	FKDTNTPSPF	VEDLSALGGP	DDTRDAKPDH
IYMDHMGFGM	GCCCLQVTFQ	AVNVDEARWL	YDQLTPITPI	LLALSAATPI	FRGKLSNVDS	RWDIISASVD	DRTPEERGLE
PLKNSKWVID	KSRYDSTDCY	IYPCSVGYND	IPLQYDETIY	KQLIDGNIDE	PLAKHIAHMF	IRDPHQVFRE	RIEQDDEKSS
EHFETIQSSN	WMNMRFKPPP	PDAPEIGWRV	EFRPTEVQLT	DFENAAAYCCF	VVLLTRMMIS	FRLTYLMPIS	MVTENMKRAQ
QKDAVLNQKF	LFRKGLAECK	SAPENLKGSE	KCGPPSQDIE	EMSIDEIING	KKNGFPGLIS	LIRQFLDSAD	VDVDTRCTIS
QYLNFIKRA	TGEINTLAHW	TRGFVQSHPA	YKHDSDVNDN	IVYDLLKKMD	AINGEDHCE	KLLGCYRSKT	DHAISAAVRK
AEEHMIVSSQ	KRAH						

Spliced mRNA							
tttgcaaat	GGGTCTTTG	ACGAAAGGTA	GTCCGTTGAC	GTGGGCAGAA	ACCGTACCGC	ACATTGATTA	TATCAAGAAG
CACGGAATTG	CTCAATTCAT	CAATCTCTAC	CATCGTCTGA	AATCAAGACA	CGGAGATCAA	TTGAAATGGG	GAGATGAGAT
TGAATACACT	ATTGTAAAT	TTGATGACGC	AAACAAGAAA	GTTCCGCTGT	CGTGCAAAGC	TGAAGAGCTT	CTTAATAAGT
TACAAGCCGA	AGAGCAGGTG	AATGCGATGC	TTGGAAGTGC	CAATCGATTC	CTTTGGAGAC	CAGAATTCGG	ATCCTACATG
ATCGAGGGAA	CCCCCGGAAT	GCCTTACGGA	GGTCTCATCG	CTTGCTTCAA	CATTGTCGAG	GCAAACATGA	AATTGCGCAG
ACAGGTCGTC	AAAAAGTTAT	TAAAGAAGGA	TGAAACATGT	CTATCGATAT	CGTTCCCATC	TCTTGGAGTA	CCTGGATTCA
CATTCCCGGA	AGTAGCAGCT	GATAGAAAGA	ATGATGATGC	AGCTAATAGC	GTTTTCTGGC	CAGAACAAGC	TGTATTCTTG
GGCCATCCAC	GTTTCAAGAA	TCTTACCAA	AATATTAAAG	GTCGCAGAGG	AAGTAAAGTA	GCTATCAACG	TCCCGATATT
CAAGGATACG	AACACCCCCA	GTCCATTCGT	TGAAGATTTA	TCTGCACTTG	GAGGTCTGA	TGATACTCGT	GATGCGAAAC
CTGATCACAT	TTATATGGAT	CATATGGGAT	TCGGAATGGG	GTGCTGTTGT	CTTCAAGTCA	CTTTCCAGGC	TGTGAACGTC
GATGAAGCCA	GATGGTTGTA	CGATCAGCTG	ACACCGATTA	CACCGATTCT	ACTGGCACTC	TCTGCCGCCA	CACCAATCTT
CCGTGGAAAA	TTATCCAATG	TCGATTCTAG	ATGGGATATC	ATTAGTGCAA	GTGTCGACGA	TCGTACACCG	GAGGAAAGAG
GATTGGAACC	TCTCAAGAAT	TCGAAATGGG	TTATTGATAA	GAGTCGCTAC	GACTCCACGG	ACTGTTACAT	TTATCCATGT
TCTGTTGGCT	ACAATGATAT	TCCTCTTCAA	TACGACGAAA	CCATATATAA	ACAACATAAT	GATGGAAATA	TTGATGAGCC
ACTGGCAAAA	CATATTGCGC	ATATGTTTCA	TCGTGATCCA	CATCAAGTTT	TCCGTGAGCG	TATCGAACAG	GACGATGAGA
AAAGCAGTGA	ACACTTTGAA	ACAATTCAAT	CATCGAATTG	GATGAACATG	CGATTCAAGC	CACCACCACC	AGATGCTCCA
GAAATCGGAT	GGAGAGTCGA	ATTCCGGCCA	ACTGAAGTTC	AACTGACCGA	CTTTGAAAAT	GCAGCATACT	GTTGCTTCGT
TGTATTGCTC	ACCAGAATGA	TGATCTCCTT	CAGGCTGACA	TATTTGATGC	CAATTTCAAT	GGTACTGAA	AATATGAAGC
GTGCTCAGCA	AAAAGATGCA	GTTCTCAATC	AGAAATTCCT	GTTTCAGAAA	GGATTGGCTG	AGTGCAAATC	TGCTCCCGAA
AATTTGAAAG	GATCGGAGAA	ATGTGGACCA	CCTAGTCAAG	ATATTGAAGA	AATGTCGATT	GATGAGATTA	TCAATGGAAA
GAAAAATGGA	TTCCAGGTC	TCATTTCACT	TATTCGCCAA	TTTCTAGATT	CTGCTGATGT	TGATGTGGAT	ACTCGGTGTA
CGATTTCTCA	ATATTTGAAC	TTTATTTTCA	AACGAGCAAC	TGGAGAGATT	AATACTTTGG	CTCACTGGAC	ACGTGGATTC
GTACAATCTC	ATCCTGCATA	CAAACATGAC	AGTGATGTAA	ATGATAATAT	AGTTTACGAT	CTTTTGAAAA	AGATGGATGC
CATCTCAAAC	GGAGAAGATC	ACTGTGAGAA	GCTGCTCGGA	TGCTACCGCT	CTAAAACCGA	TCATGCCATT	TCTGCTGCTG
TTGCGAAAGC	TGAAGAGCAC	ATGATCGTGT	CCAGCCAAAA	ACGTGCACAT	TAGgcgataa	ttgattgatt	atgtgatttt
aatttattta	tgttctatac	gtcgtgtttc	ccattccttc	taggccttcc	atgattcaca	atttttcgat	gccatatcaa
tttagttggc	catctacatt	aaattactga	tatgttgatg	ctattttcta	gtaagcagat	gtcagtggtt	agtaattcaa
aaatttaaac	tctgaatttc	taaatgcttg	ttttttgagt	agtaggaatc	agtacgaatg	gtacattaat	ctgaaaataa
tttcatatth	atgtacaatg	ctccccctgaa	tccatcatat	aattattatc	cgtgttg		

FIG. 28



[illegible]

MYTDSNNRNF	DEVNHQHQQE	QDFNGQSKYD	YPQFNRP MGL	RWRDDQRMME	YFMSNGPVET	VPVMPILTEH
PPASPFGRGP	STERPTTSSR	YEYSSPSLED	IDLIDVLWRS	DIAGEKGTRQ	VAPADQYECD	LQTLTEKSTV
APLTAEENAR	YEDLSKGFYN	GFFESFN NNQ	YQOKHQQQQR	EQIKTPTLEH	PTQKAELEDD	LFD EDLAQLF
EDVSREEGQL	NQLFDNKQQH	PVINNVSLSE	GIVYNQANLT	EMQEMRDSCN	QVSISTIPTT	STAQPETLFN
VTDSQTVEQW	LPTEVVPNDV	FPTS NYAYIG	MQND SLQAVV	SNGQIDYDHS	YQSTGQTPLS	PLIIGSSGRQ
QQTQTSPGSV	TVTATATQSL	FDPYHSQRHS	FSDCTTDSSS	TCSRLSSESP	RYTSESSTGT	HESRFY GKLA
PSSG\$RYQRS	SSPRSSQSSI	KIARVVPLAS	GQRKRGRQSK	DEQLASDNEL	PVSAFQISEM	SLSELQQVLK
NESLSEYQRO	LIRKIRRRGK	NKVAARTCRQ	RRTDRHDKMS	HYI*		



T19E7.2b (conceptual translation)

MSLP SDFASS LLASSTTTNT TNTAPAAVNS FDEQEEESKK ILNMYLOMFN QQQVDQHGHH HQHPYAYSGV  
SSTFDRVFPT SNYAYIGMQN QSLQAVVSNG QIDYDHSYQS TGQTPLSPLI IGSSGRQQQT QTSPGSVTVT  
ATATQSLFDP YHSQRHSFSD CTTDSSSTCS RLSSESPRYT SESSTGTHES RFYGKLAPSS GSR YQRSSSP  
RSSQSSIKIA RVVPLASGQR KRGRQSKDEQ LASDNELPVS AFQISEMSLS ELQQVLKNES LSEYQRQLIR  
KIRRRGKNKV AARTCRQRRT DRHDKMSHYI \*

FIG. 30



[illegible]

ataaaatctc	ggtcgaaacc	ttatttaaagc	cacataatta	aagataatta	attccgccac	gaagccct	cttttatcac
tttttcttct	ttgccgtgtc	tcatttcatt	ttgatctact	ctttcctccc	ttcggattct	aataatcggt	ttgatttccc
agtgaaatac	ctcaccctact	tcaatcccca	caaagtgagc	aaccctatc	ttgcaacagt	tttatcatct	tagtatccta
cttcatcata	cccagtttga	taattttatta	tctgatcccc	atccccttgt	cgctctcat	aatagataga	aacgggtctc
gtttttcatt	tgagcccgga	gctcagacta	catctccgaa	tcatcataca	atacacctga	aaaatatgat	cttttttgto
gtgacgaaag	aatacgtgca	ccacacgacc	ccccatcct	gttcaccccc	atttcctctt	atccctcctc	tttgaatctc
ctttacagtt	atttctatta	tatcctcaaa	tctctcgtaa	tatcgtatca	tggaacttgt	tttgaatctc	
attttcaatt	tttctcaaat	ttctcagatc	tattcttttt	cttgtatttt	ccatatatcg		
catcccaga	cttccccttc	ccagttactc	ttgtacattt	tcatatatgt			
tcattttaigg	aaataaattt	gaaaaaatc					

T19E7.2a (conceptual translation)

MGGSSRRQRS	TSATRRDDKR	RRRQCFSSVA	DDEEETTSIY	GVSSIFIWIL	ATSSLILVIS	SPSSNTSIQS
SSYDRITTKH	LLDNISPTFK	MYTDSNNRNF	DEVNHQHQQE	QDFNGQSKYD	YPQFNRP MGL	RWRDDQRMME
YFMSNGPVET	VPVMPILTEH	PPASPFGRGP	STERPTTSSR	YEYSSPSLED	IDLIDVLWRS	DIAGEKGTRQ
VAPADQYECD	LQTLTEKSTV	APLTAEENAR	YEDLSKGFYN	GFFESFNNNQ	YQOKHQQQQR	EQIKTPTLEH
PTQKAELEDD	LFDEDLAQLF	EDVSREEGQL	NQLFDNKQQH	PVINNVSLSE	GIVYNQANLT	EMQEMRDSCN
QVSISTIPTT	STAQPETLFN	VTDSQTVEQW	LPTEVVPNDV	FPTS NYAYIG	MONDSLQAVV	SNGQIDYDHS
YQSTGQTPLS	PLIIGSSGRQ	QQTQTS PGSV	TVTATATQSL	FDPYHSQRHS	FSDCTTDSSS	TCSRLSSESP
RYTSESSTGT	HESRFYKLA	PSSGSRYQRS	SSPRSSQSSI	KIARVVPLAS	GQRKRGRQSK	DEQLASDNEL
PVSAFQISEM	SLSELOQVLK	NESLSEYQRQ	LIRKIRRRGK	NKVAARTCRQ	RRTDRHDKMS	HYI*

FIG. 31

Human Glycogen synthase kinase-3 beta (GSK-3 beta).

```
1 msgrprttsf aesckpvqgp safgsmkvsr dkdgskvttv vatpgqgpdv pgevsytdtk  
61 vigngsfgvv yqaklcdsge lvaikkvlqd krfrknrelqi mrklhdhcniv rlryffysg  
121 ekkdevylnl vldyvpety rvarhysrak qtlpvivvkl ymyqlfrsla yhsfgichr  
181 dikpqnllld pdtavklcd fgsakqlvrg epnvsyicsr yyrapelifg atdytssidv  
241 wsagcvlael llgqpifpgd sgvdqlveii kvlgtptrgq iremnpnyte fkfpqikahp  
301 wtkvfrprtp peaiialcsrl leytparlt pleacahsff delrdpnvkl pngrdtpalf  
361 nfttgelssn pplatilipp hariqaaast ptnataasda ntgdrqgtnn aasasasnst
```

FIG. 32

Human Glycogen synthase kinase-3 alpha (GSK-3 alpha).

```
1 msgggpsggg pggsgrarts sfaepggggg gggggpggsa sgpggtgggk asvgamgggv
61 gasssgggpg gsgggsggpg gagtsfpppg vklgrdsgkv ttvvatlgqg persqevayt
121 dikvigngsf gvvyqarlar trelvaikkv lqdkrfknre lqimrkldhc nivrlryffy
181 ssgekkdely lnlvleyvpe tvyrvarhft kakltipily vkvymyqlfr slayihsqgv
241 chrdikpqn1 lvdptavlk lcdfgsakql vrgepnvsi csryyrapel ifgatdytss
301 idvwsagcvl ae11lgqpif pgdsgvdqlv eiikvlgtpt requiremnpn ytefkfpqik
361 ahpwtkvfks rtppeaialc ssleytpss rlspleacah sffdelrc1g tq1pnnrplp
421 plfnfsagel siqpslnail ipphlrspag tttltppssa ltetptssdw qstdatptlt
481 nss
```

FIG. 33



## Mouse Glycogen synthase kinase-3 beta.

```
1 msgrrprttsf aesckpvqpp safgsmkvsr dkdgskvttv vatpgggpdr pgevsytdtk
61 vigngsfgvv yqaklcdsge lvaikkvlqd krkfnrelqi mrkl dhcniv rlryffysg
121 ekkdevylnl vldyvpety rvarhysrak qtlpviyvk ymyqlfrsla yihsfgichr
181 dikpqnllld pdtavklcd fgsakqlvrg epnvsyicsr yyrapelifg atdytssidv
241 wsagcvlael llgqpifpgd sgvdqlveii kvlgtptreq iremnpnyte fkfpqikahp
301 wtkvfrprtp peaialcsl leytparlt pleacahsff delrdpnvkl pngrdtpalf
361 nfttqelssn pplatilipp hariqaaasp panataasdt nagdrgqtnn aasasasnst
```

FIG. 34

## Mouse Glycogen synthase kinase-3 alpha (GSK-3 alpha).

```
1 masttamdvl eelssdssek qrsvnildsf vkdmferias easflarqar nstinsreiq
61 tairlllpge lcrrgtgcgk asvwamgggv gasssgvggg sggpgstsfl qpgvklghds
121 rkvtvvvatv gqdpersqev actdikvign gsfgvvyqew ladtrelvai kkvlqdkrfk
181 yrelqimckl dhcnivrlqy ffyssgekdd dlylnlvley vpetvyxvar hftkakliip
241 iiyvkvymyq lfrslayihs qgvchrdinl lvdpdtaikl lcdfgsakql vlgttvapel
301 ytssidvxsa gcvlaellls qpifpgdngv dqlveiikvl gtptrequire mnpkytefkf
361 pqikahpwtk vfksrtaprp lhsalacwst hhtqgsphlr lvptaslmnc gvsgpapqrp
421 ptspcstsvl vicpsnhlsm pfssllt
```

FIG. 35

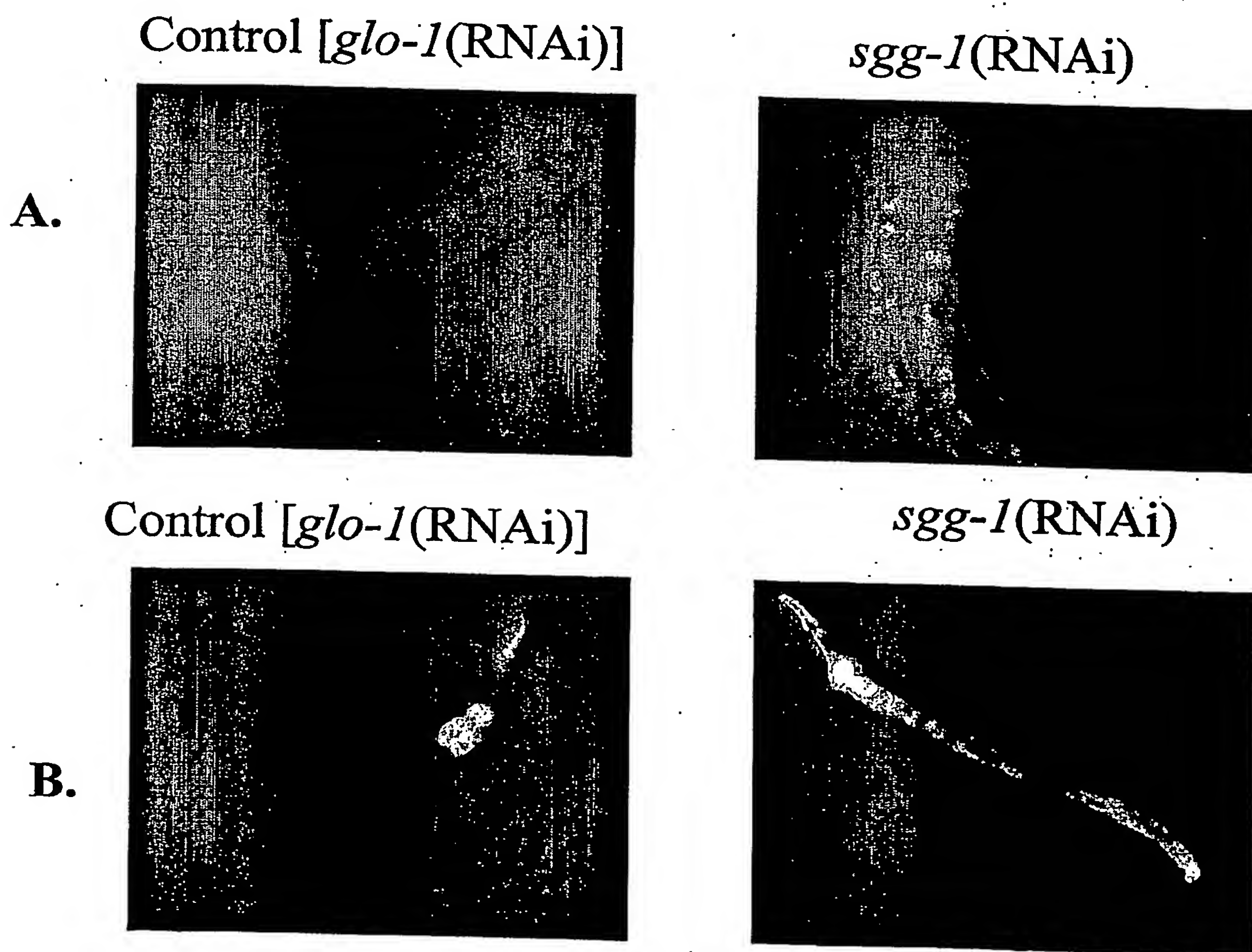
GSK-3 [*Caenorhabditis elegans*].

```
1 mnkqlscsl ksgkqvtnvy asvatdgvdq qveisyydqk vngsgfgvv flaklstne
61 mvaikkvlqd krknrelqi mrklnhpniv klkyffysg ekkdelylnl ileyvpety
121 rvarhyskqr qqipmiyvk1 ymyqlrsla yihsigichr dikpqnllid pesgvlklcd
181 fgsakylvrn epnvsyicsr yyrapelifg atnytnsidv wsagtvmael llgqpifpgd
241 sgvdqlveii kvlgtpreq iqsmnpnyke fkfpqikahp wnkvrfrvhtp aeaidliski
301 ieypptsrpt pqaacqhaff delrnpdarl psgrplptle mdgpmgtgei sptsgdvagg
361 sa
```

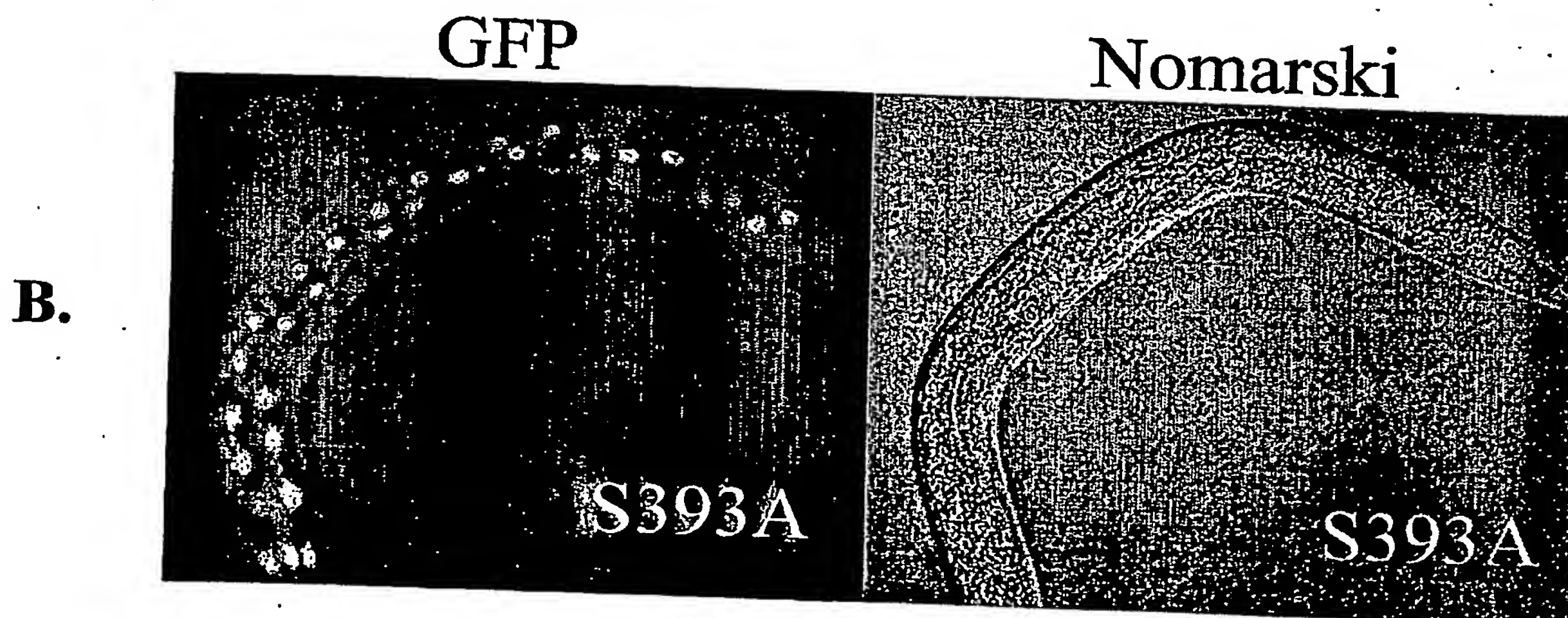
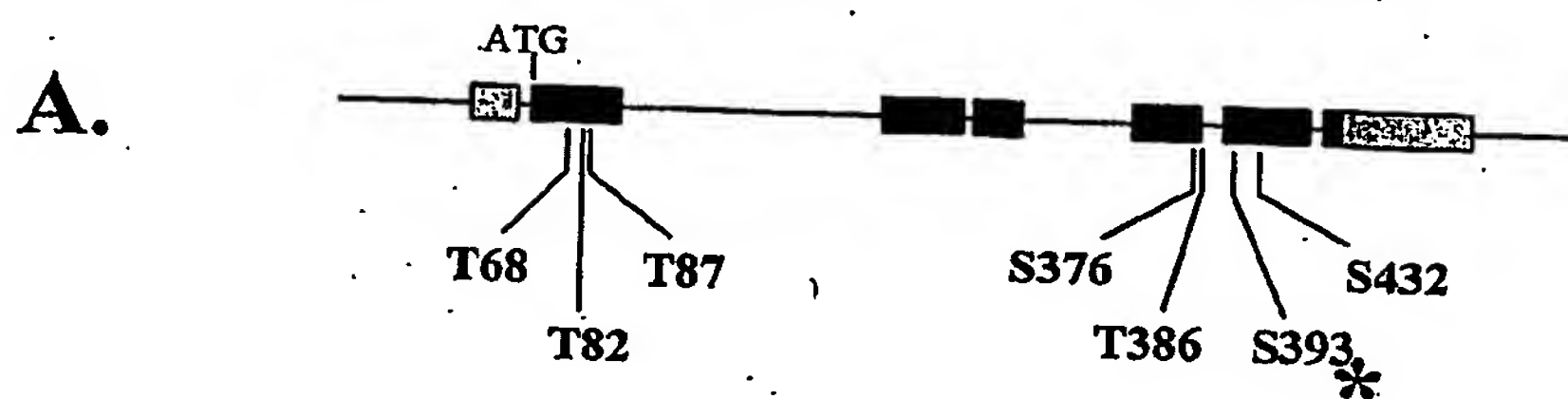
FIG. 36

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***sgg-1* (GSK-3) inhibits constitutive SKN-1 nuclear accumulation and induction of its target gene *gcs-1*.**

**FIG. 37**

**Ala substitution at a predicted GSK-3 phosphorylation site results in nuclear localization of SKN-1**

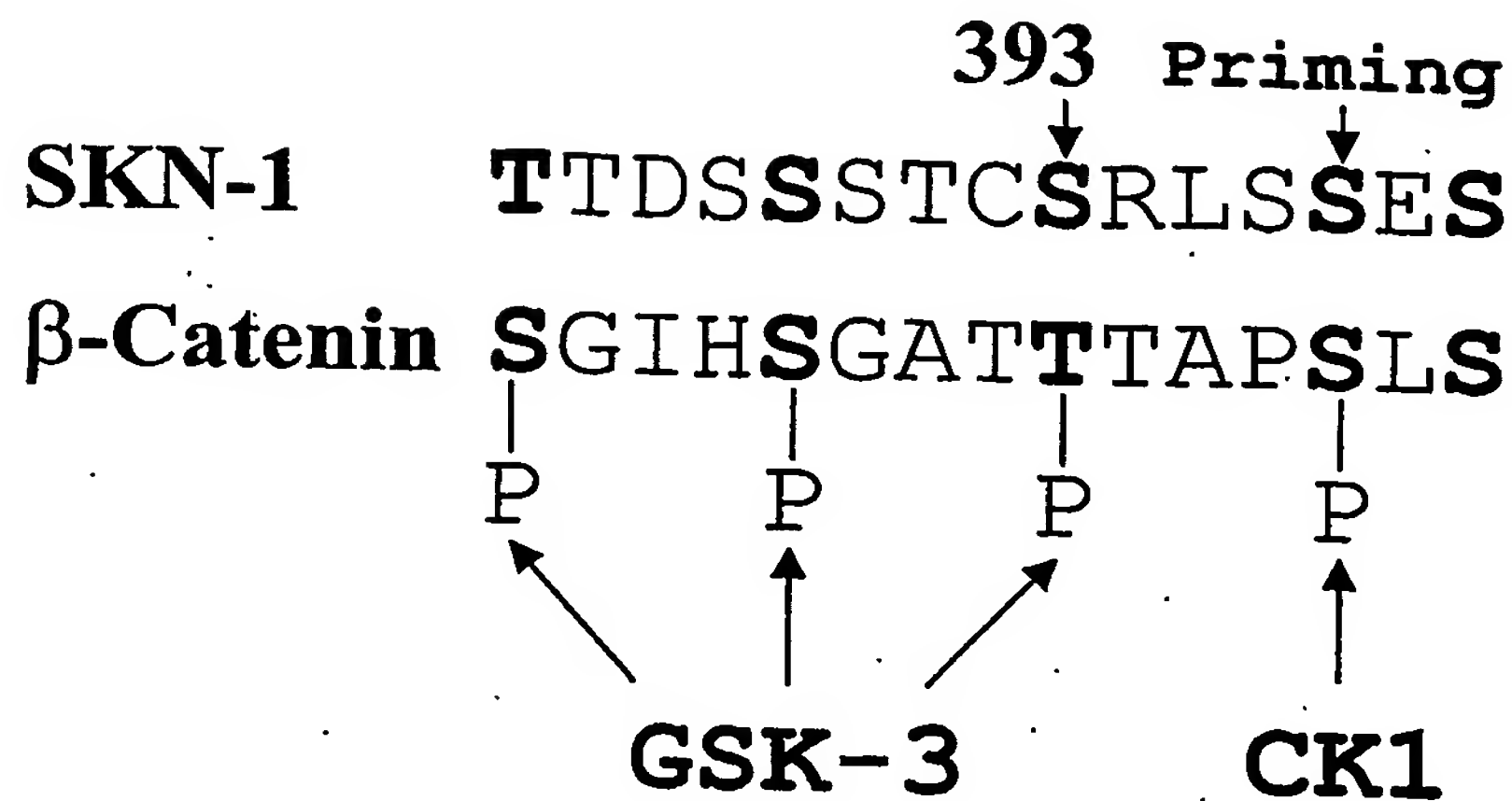


**FIG. 38**



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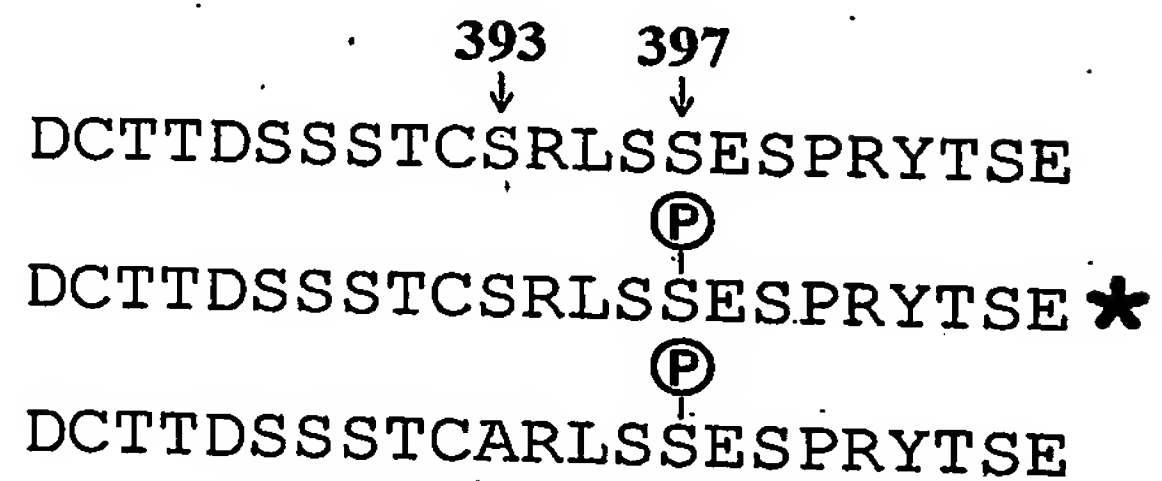
A.



**Peptides:** 1. WT

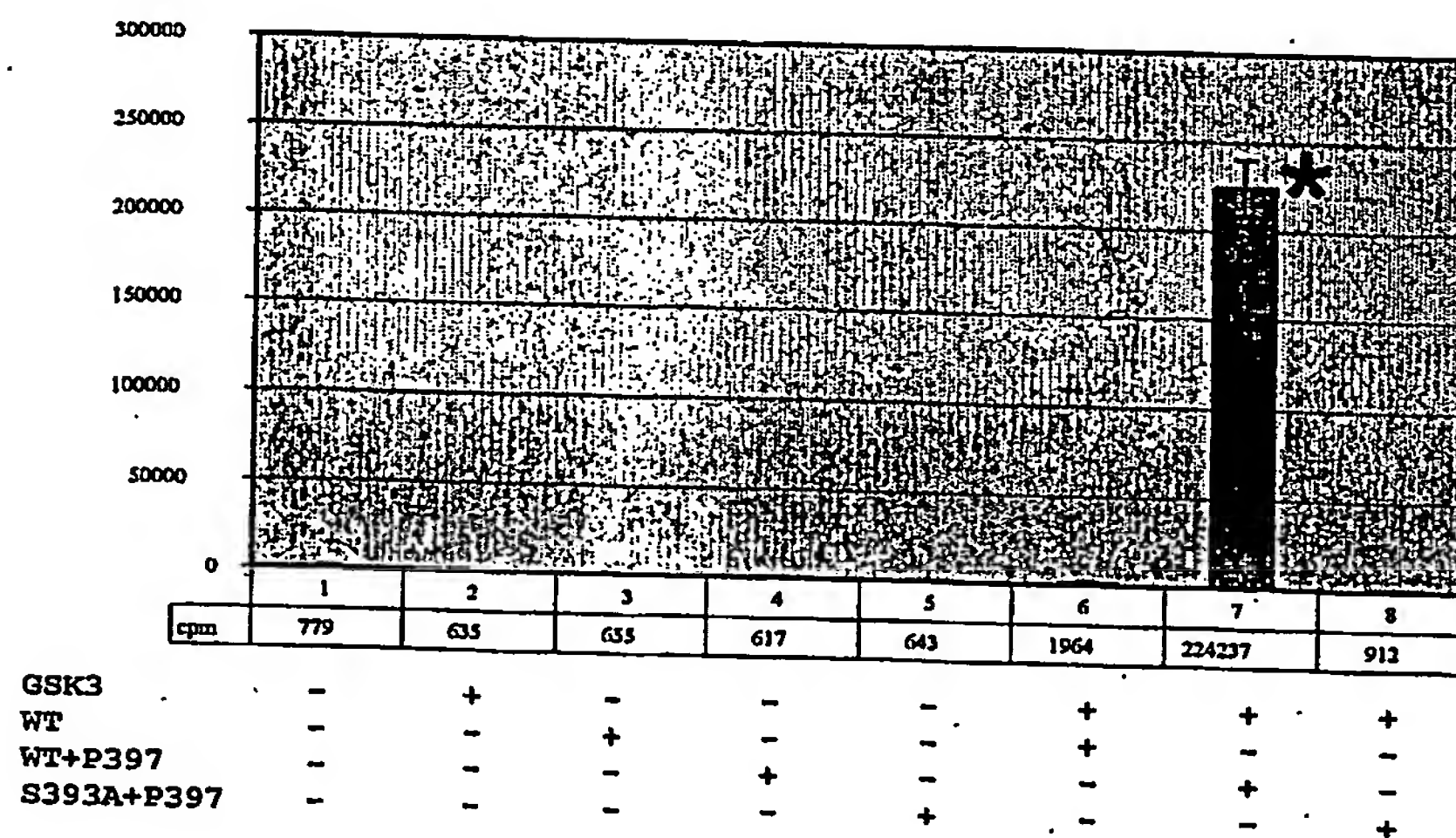
2. WT+P397

3. S393A+P397



**Assay:**

B.



**FIG. 39**

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